	Census Tract 458.10, Virginia Beach city, Virginia		Census Tract 460.13, Virginia Beach city, Virginia	
	Estimate	Margin of Error	Estimate	Margin of Error
Median value (dollars)	144,400	+/-13,583	163,000	+/-22,775

Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a margin of error. The value shown here is the 90 percent margin of error. The margin of error can be interpreted roughly as providing a 90 percent probability that the interval defined by the estimate minus the margin of error and the estimate plus the margin of error (the lower and upper confidence bounds) contains the true value. In addition to sampling variability, the ACS estimates are subject to nonsampling error (for a discussion of nonsampling variability, see Accuracy of the Data). The effect of nonsampling error is not represented in these tables.

While the 2013-2017 American Community Survey (ACS) data generally reflect the February 2013 Office of Management and Budget (OMB) definitions of metropolitan and micropolitan statistical areas; in certain instances the names, codes, and boundaries of the principal cities shown in ACS tables may differ from the OMB definitions due to differences in the effective dates of the geographic entities.

Estimates of urban and rural populations, housing units, and characteristics reflect boundaries of urban areas defined based on Census 2010 data. As a result, data for urban and rural areas from the ACS do not necessarily reflect the results of ongoing urbanization.

Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates

Explanation of Symbols:

1. An '**' entry in the margin of error column indicates that either no sample observations or too few sample observations were available to compute a standard error and thus the margin of error. A statistical test is not appropriate.

2. An '-' entry in the estimate column indicates that either no sample observations or too few sample observations were available to compute an estimate, or a ratio of medians cannot be calculated because one or both of the median estimates falls in the lowest interval or upper interval of an open-ended distribution.

3. An '-' following a median estimate means the median falls in the lowest interval of an open-ended distribution.

4. An '+' following a median estimate means the median falls in the upper interval of an open-ended distribution.

5. An '***' entry in the margin of error column indicates that the median falls in the lowest interval or upper interval of an open-ended distribution. A statistical test is not appropriate.

6. An '******' entry in the margin of error column indicates that the estimate is controlled. A statistical test for sampling variability is not appropriate.

7. An 'N' entry in the estimate and margin of error columns indicates that data for this geographic area cannot be displayed because the number of sample cases is too small.

8. An '(X)' means that the estimate is not applicable or not available.

06/10/2019

Appendix I3

Illustrative Plan Socioeconomic Characteristics

District 2 - Majority HBA Census Tracts (2013-2017 5Yr ACS)

- 402, 404.02, 406, 462.20, and 462.21

U.S. Census Bureau

AMERICAN
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S1903   MEDIAN INCOME IN THE PAST 12 MONTHS (IN 2017 INFLATION-ADJUSTED DOLLARS)

2013-2017 American Community Survey 5-Year Estimates

Note: This is a modified view of the original table.

Supporting documentation on code lists, subject definitions, data accuracy, and statistical testing can be found on the American Community Survey website in the Technical Documentation section.

Sample size and data quality measures (including coverage rates, allocation rates, and response rates) can be found on the American Community Survey website in the Methodology section.

Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, it is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities, and towns and estimates of housing units for states and counties.

Subject	Virginia Beach city, Virginia Median income (dollars)		Census Tract 402, Virginia Beach city, Virginia Median income (dollars)		Census Tract 404.02, Virginia Beach city, Virginia Median Income (dollars)	
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Households	70,500	+/-1,124	46,952	+/-5,406	41,852	+/-9,953
White alone, not Hispanic or Latino	76,547	+/-1,239	53,177	+/-8,787	55,516	+/-12,877

Subject	Census Tract 406, Virginia Beach city, Virginia Median Income (dollars)		Census Tract 462.20, Virginia Beach city, Virginia Median Income (dollars)		Census Tract 462.21, Virginia Beach city, Virginia Median income (dollars)	
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Households	53,007	+/-13,152	41,898	+/-9,854	54,076	+/-8,769
White alone, not Hispanic or Latino	71,027	+/-9,929	55,018	+/-18,234	58,542	+/-16,490

Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a margin of error. The value shown here is the 90 percent margin of error. The margin of error can be interpreted roughly as providing a 90 percent probability that the interval defined by the estimate minus the margin of error and the estimate plus the margin of error (the lower and upper confidence bounds) contains the true value. In addition to sampling variability, the ACS estimates are subject to nonsampling error (for a discussion of nonsampling variability, see Accuracy of the Data). The effect of nonsampling error is not represented in these tables.

When information is missing or inconsistent, the Census Bureau logically assigns an acceptable value using the response to a related question or questions. If a logical assignment is not possible, data are filled using a statistical process called allocation, which uses a similar individual or household to provide a donor value. The "Allocated" section is the number of respondents who received an allocated value for a particular subject.

While the 2013-2017 American Community Survey (ACS) data generally reflect the February 2013 Office of Management and Budget (OMB) definitions of metropolitan and micropolitan statistical areas; in certain instances the names, codes, and boundaries of the principal cities shown in ACS tables may differ from the OMB definitions due to differences in the effective dates of the geographic entities.

Estimates of urban and rural populations, housing units, and characteristics reflect boundaries of urban areas defined based on Census 2010 data. As a result, data for urban and rural areas from the ACS do not necessarily reflect the results of ongoing urbanization.

Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates

Explanation of Symbols:

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3. An '-' following a median estimate means the median falls in the lowest interval of an open-ended distribution.
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7. An 'N' entry in the estimate and margin of error columns indicates that data for this geographic area cannot be displayed because the number of sample cases is too small.
8. An '(X)' means that the estimate is not applicable or not available.

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U.S. Census Bureau

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AMERICAN

S1501 | EDUCATIONAL ATTAINMENT

2013-2017 American Community Survey 5-Year Estimates

Note: This is a modified view of the original table.

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Sample size and data quality measures (including coverage rates, allocation rates, and response rates) can be found on the American Community Survey website in the Methodology section.

Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, it is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities, and towns and estimates of housing units for states and counties.

Subject	Virginia Beach city, Virginia		Census Tract 402, Virginia Beach city, Virginia		Census Tract 404.02, Virginia Beach city, Virginia	
	Percent		Percent		Percent	
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Population 25 years and over	(X)	(X)	(X)	(X)	(X)	(X)
Less than 9th grade	2.0%	+/-0.2	5.5%	+/-3.3	2.3%	+/-2.0
9th to 12th grade, no diploma	4.6%	+/-0.3	9.3%	+/-3.9	12.8%	+/-4.0
High school graduate (includes equivalency)	21.9%	+/-0.6	27.6%	+/-5.4	23.7%	+/-6.4
Some college, no degree	26.1%	+/-0.6	28.9%	+/-5.4	29.5%	+/-5.4
Associate's degree	10.5%	+/-0.4	13.0%	+/-4.5	12.9%	+/-4.9
Bachelor's degree	22.7%	+/-0.5	9.4%	+/-3.3	14.8%	+/-4.6
Graduate or professional degree	12.1%	+/-0.4	6.3%	+/-2.7	4.0%	+/-2.5
Percent high school graduate or higher	93.4%	+/-0.3	85.2%	+/-5.6	84.9%	+/-3.9
Percent bachelor's degree or higher	34.8%	+/-0.6	15.7%	+/-3.9	18.9%	+/-5.0
White alone, not Hispanic or Latino	(X)	(X)	(X)	(X)	(X)	(X)
High school graduate or higher	95.3%	+/-0.3	89.8%	+/-5.7	93.0%	+/-5.8
Bachelor's degree or higher	37.7%	+/-0.8	10.8%	+/-7.7	26.2%	+/-10.9

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Subject	Census Tract 406, Virginia Beach city, Virginia Percent		Census Tract 462.20, Virginia Beach city, Virginia Percent		Census Tract 462.21, Virginia Beach city, Virginia Percent	
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Population 25 years and over						
Less than 9th grade	(X)	(X)	(X)	(X)	(X)	(X)
9th to 12th grade, no diploma	1.0%	+/-1.5	2.7%	+/-2.2	1.9%	+/-1.7
High school graduate (includes equivalency)	3.9%	+/-2.7	4.3%	+/-2.1	12.3%	+/-6.2
Some college, no degree	21.1%	+/-5.0	24.1%	+/-5.2	21.9%	+/-5.8
Associate's degree	41.6%	+/-7.2	35.6%	+/-7.2	38.2%	+/-7.1
Bachelor's degree	13.5%	+/-3.8	8.8%	+/-4.2	12.8%	+/-5.3
Graduate or professional degree	12.8%	+/-4.2	14.3%	+/-4.2	9.5%	+/-3.8
	5.9%	+/-2.9	10.2%	+/-4.2	3.3%	+/-2.3
Percent high school graduate or higher	95.1%	+/-3.1	93.0%	+/-3.5	85.7%	+/-6.0
Percent bachelor's degree or higher	18.8%	+/-5.4	24.5%	+/-6.5	12.8%	+/-4.6
White alone, not Hispanic or Latino						
High school graduate or higher	(X)	(X)	(X)	(X)	(X)	(X)
Bachelor's degree or higher	97.6%	+/-3.2	95.5%	+/-3.1	78.7%	+/-17.2
	17.3%	+/-6.5	28.0%	+/-9.2	19.0%	+/-10.6

Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a margin of error. The value shown here is the 90 percent margin of error. The margin of error can be interpreted roughly as providing a 90 percent probability that the interval defined by the estimate minus the margin of error and the estimate plus the margin of error (the lower and upper confidence bounds) contains the true value. In addition to sampling variability, the ACS estimates are subject to nonsampling error (for a discussion of nonsampling variability, see Accuracy of the Data). The effect of nonsampling error is not represented in these tables.

While the 2013-2017 American Community Survey (ACS) data generally reflect the February 2013 Office of Management and Budget (OMB) definitions of metropolitan and micropolitan statistical areas; in certain instances the names, codes, and boundaries of the principal cities shown in ACS tables may differ from the OMB definitions due to differences in the effective dates of the geographic entities.

Estimates of urban and rural populations, housing units, and characteristics reflect boundaries of urban areas defined based on Census 2010 data. As a result, data for urban and rural areas from the ACS do not necessarily reflect the results of ongoing urbanization.

Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates

Explanation of Symbols:

1. An '**' entry in the margin of error column indicates that either no sample observations or too few sample observations were available to compute a standard error and thus the margin of error. A statistical test is not appropriate.
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U.S. Census Bureau

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S1701 | POVERTY STATUS IN THE PAST 12 MONTHS

2013-2017 American Community Survey 5-Year Estimates

Note: This is a modified view of the original table.

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Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, it is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities, and towns and estimates of housing units for states and counties.

Subject	Virginia Beach city, Virginia		Census Tract 402, Virginia Beach city, Virginia		Census Tract 404.02, Virginia Beach city, Virginia	
	Percent below poverty level		Percent below poverty level		Percent below poverty level	
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Population for whom poverty status is determined	8.0%	+/-0.5	19.9%	+/-6.1	14.9%	+/-6.2
White alone, not Hispanic or Latino	5.8%	+/-0.5	8.6%	+/-4.9	9.3%	+/-5.8

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Subject	Census Tract 406, Virginia Beach city, Virginia Percent below poverty level		Census Tract 462.20, Virginia Beach city, Virginia Percent below poverty level		Census Tract 462.21, Virginia Beach city, Virginia Percent below poverty level	
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Population for whom poverty status is determined	20.2%	+/-8.5	12.3%	+/-4.1	18.1%	+/-9.8
White alone, not Hispanic or Latino	11.9%	+/-9.5	6.7%	+/-4.4	2.6%	+/-4.3

Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a margin of error. The value shown here is the 90 percent margin of error. The margin of error can be interpreted roughly as providing a 90 percent probability that the interval defined by the estimate minus the margin of error and the estimate plus the margin of error (the lower and upper confidence bounds) contains the true value. In addition to sampling variability, the ACS estimates are subject to nonsampling error (for a discussion of nonsampling variability, see Accuracy of the Data). The effect of nonsampling error is not represented in these tables.

While the 2013-2017 American Community Survey (ACS) data generally reflect the February 2013 Office of Management and Budget (OMB) definitions of metropolitan and micropolitan statistical areas; in certain instances the names, codes, and boundaries of the principal cities shown in ACS tables may differ from the OMB definitions due to differences in the effective dates of the geographic entities.

Estimates of urban and rural populations, housing units, and characteristics reflect boundaries of urban areas defined based on Census 2010 data. As a result, data for urban and rural areas from the ACS do not necessarily reflect the results of ongoing urbanization.

Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates

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06/10/2019

U.S. Census Bureau

AMERICAN
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B25077 | MEDIAN VALUE (DOLLARS)
Universe: Owner-occupied housing units
2013-2017 American Community Survey 5-Year Estimates

Supporting documentation on code lists, subject definitions, data accuracy, and statistical testing can be found on the American Community Survey website in the Technical Documentation section.

Sample size and data quality measures (including coverage rates, allocation rates, and response rates) can be found on the American Community Survey website in the Methodology section.

Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, it is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities, and towns and estimates of housing units for states and counties.

	Virginia Beach city, Virginia		Census Tract 402, Virginia Beach city, Virginia		Census Tract 404.02, Virginia Beach city, Virginia	
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Median value (dollars)	267,300	+/-2,392	124,600	+/-14,726	164,700	+/-8,297

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	Census Tract 406, Virginia Beach city, Virginia		Census Tract 462.20, Virginia Beach city, Virginia		Census Tract 462.21, Virginia Beach city, Virginia	
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Median value (dollars)	153,400	+/-14,439	211,000	+/-12,003	148,300	+/-10,154

Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a margin of error. The value shown here is the 90 percent margin of error. The margin of error can be interpreted roughly as providing a 90 percent probability that the interval defined by the estimate minus the margin of error and the estimate plus the margin of error (the lower and upper confidence bounds) contains the true value. In addition to sampling variability, the ACS estimates are subject to nonsampling error (for a discussion of nonsampling variability, see Accuracy of the Data). The effect of nonsampling error is not represented in these tables.

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06/10/2019

Anthony E. Fairfax

Anthony E. Fairfax is a Demographic Consultant and President of CensusChannel LLC. For over 20 years, Mr. Fairfax worked as a demographic data & mapping consultant. Specializing in redistricting, he has personally developed hundreds of redistricting plans covering 22 different states.

During the span of his consulting tenure, Mr. Fairfax provided redistricting services and training to numerous non-profit and public sector groups. A partial list of these organizations include:

- Advancement Project;
- African American Redistricting Collaborative of California;
- Congressional Black Caucus Institute;
- Louisiana Legislative Black Caucus;
- National NAACP;
- NAACP Legal Defense Fund (LDF);
- One Voice;
- Southern Coalition for Social Justice;
- Young Elected Officials (YEO) Network.

Mr. Fairfax worked as an expert providing redistricting plans, research and analysis for several court cases. Recently, he was an expert witness for one of the plaintiffs in the recent Texas court case (Perez vs State of Texas). In addition, he was selected as the Project Director and Consulting Demographer for the Congressional Black Caucus Institute's (CBC Institute) Redistricting Project. Ten years prior, during the 2000 redistricting cycle, he was the CBC Institute's Consulting Demographer as well.

Mr. Fairfax has published two unique books: A Step-by-Step Guide to Using Census 2000 Data (2004); and The Democratic Trend Phenomenon (2008). He is an Electrical Engineering graduate of Virginia Tech and resides in Hampton, Virginia.

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REPORT OF PETER A. MORRISON, PH.D.

In *Holloway, et al. v. City of Virginia Beach, et al.*

August 12, 2019

1. I have been retained as an expert in the case of *Holloway, et al. v. City of Virginia Beach, et al.* by the City of Virginia Beach. I have been asked to evaluate Plaintiffs' November 13, 2018 *Amended Complaint* and the July 15, 2019 *Expert Report of Anthony E. Fairfax* (Plaintiffs' expert). The specific focus of my evaluation is Plaintiffs' claim that "The minority citizen voting age population is sufficiently large and geographically compact to constitute a majority in at least two single-member districts that would be likely able to elect their candidates of choice to the City Council" [Amended Complaint at paragraph 8]. That claim is based upon Mr. Fairfax's findings and his definition of the *minority citizen voting age population* as the combined Hispanic, Black, and Asian citizen voting age citizen population ("the HBA citizen voting age population") of the City of Virginia Beach.

2. My evaluation relies on the following sources: (1) official demographic data from the US Census Bureau; (2) data provided to me at my request by Mr. Kimball Brace; (3) Plaintiffs' *Complaint* and Mr. Fairfax's *Expert Report*; (4) GIS shape files and demographic data that Plaintiffs have provided, which Mr. Fairfax purportedly has used and/or relied upon; (5) US Census Bureau technical documentation pertaining to the American Community Survey.

3. I am an applied demographer and am retired from The RAND Corporation, where I was Senior Demographer and the founding director of RAND's Population Research Center. I have served on the U.S. Census Bureau Advisory Committee on Population Statistics, 1989-1995, and as an invited participant on the Bureau's Working Group on 2010 Race and Ethnicity. I have been elected as President of the Southern Demographic Association and to the Board of Directors of the Population Association of America, which are the two leading associations of professional demographers. I have taught students at the University of Pennsylvania, the RAND Graduate School, and the University of Helsinki. I am being compensated at a rate of $250/hour for my work in reviewing materials and preparing this report. I will be compensated at a rate of $400/hour for any testimony I give in court or by deposition.

4. Attached Appendix A lists all cases in which I have testified by declaration, deposition, or at trial since August 2012. Attached Appendix B summarizes my academic background, including all publications in the last ten years.

5. All conclusions contained within my following Report are to the reasonable degree of scientific certainty (at least 90% certain) that scholars and experts in my field use.

I. FINDINGS AND CONCLUSIONS

SUMMARY OF FINDINGS AND CONCLUSIONS

6. ***Plaintiffs base their claim to have satisfied the first of the three necessary "Gingles preconditions" upon Mr. Fairfax's flawed findings.*** This first Gingles prong requires a plaintiff to show that the minority group is "sufficiently large and geographically compact to constitute a majority in a single-member district." Mr. Fairfax's findings themselves are hopelessly flawed by obvious inconsistencies in the data he used, which include numbers that do not add up as they should. He cannot draw conclusions or make estimates with any reasonable degree of scientific certainty.

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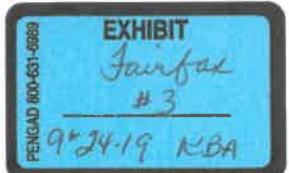
7. ***Plaintiffs purport to satisfy first Gingles prong by defining a concocted aggregate of three distinct protected minorities (Hispanics, Blacks, and Asians).*** Here, Plaintiffs rely upon Mr. Fairfax's definition of the *minority citizen voting age population* as the combined Hispanic, Black, and Asian citizen voting age citizen population ("the HBA citizen voting age population") of the City of Virginia Beach. I replicated Mr. Fairfax's aggregation of his own block-level data to form his two proposed districts (using his GIS shape files to allocate his own defective data). By my calculations, Mr. Fairfax should have obtained "HBA citizen voting age population" shares of CVAP fractionally below those he reports in Table 7 in his *Expert Report* (at page 20). Specifically, I obtain 49.99% for his District 1 (vs. his 50.03%) and 49.96% for his District 2 (vs. his 50.04%). Even were his estimates accepted as accurate, he cannot draw conclusions about the minority CVAP with any reasonable degree of scientific certainty.

8. ***Based upon the above findings, I conclude that Plaintiffs have not satisfied the first of the three necessary "Gingles preconditions" for a claim of vote dilution under Section 2, nor could they do so.*** Plaintiffs' claim depends upon the opinion that Mr. Fairfax has rendered. I regard his opinion as inherently unreliable. It is based upon his faulty interpretation of a measure that he derived from a defective dataset.

RESPONSE TO FAIRFAX REPORT: DETAILED FINDINGS

9. Mr. Fairfax was retained by counsel representing the Plaintiffs in this lawsuit to determine whether it is possible to draw an Illustrative Plan with two majority Latino (Hispanic), Black, and Asian ("HBA") combined districts in the City of Virginia Beach, using ten single-member voting districts and one at-large mayoral race.

10. Mr. Fairfax's definition of a majority "HBA" district is one in which the *minority citizen voting age population* is the combined Hispanic, Black, and Asian citizen voting age citizen population ("the HBA citizen voting age population") of the City of Virginia Beach. This "tripart minority coalition" district presumes political cohesion among Hispanics, Blacks, and Asians (an embedded assumption without support).

11. Using that definition, Mr. Fairfax (and Plaintiffs, in turn) claim to have satisfied the first of the three necessary "Gingles preconditions". This first Gingles prong requires a plaintiff to show that the minority group is "sufficiently large and geographically compact to constitute a majority in a single-member district."

Mr. Fairfax's Demonstrative Districts

12. Plaintiffs claim specifically that "The minority [i.e., "HBA"] citizen voting age population is sufficiently large and geographically compact to constitute a majority in at least two single-member districts that would be likely able to elect their candidates of choice to the City Council" [*Amended Complaint* at paragraph 8]. That claim is based upon Mr. Fairfax's findings (at paragraphs (e) and (h) on pp. 4-5 of his *Expert Report*). There, Mr. Fairfax defines the *minority citizen voting age population* as the combined Hispanic, Black, and Asian citizen voting age population ("the HBA citizen voting age population") of the City of Virginia Beach. Further on (at page 20 of his Report), Mr. Fairfax presents details in his Table 7 (shown below):

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Table 7 – Illustrative Plan - Major Race/Ethnicity using CVAP (2013-17 ACS)							
District	CVAP 13-17ACS	Dev	HCVAP 13-17ACS	WCVAP 13-17ACS	BCVAP 13-17ACS	ACVAP 13-17ACS	HBACVAP 13-17ACS
1	29761	157	2176	13730	9135	3566	14888
2	32804	-2090	2235	15543	12810	1367	16415
District	% CVAP 13-17ACS	% Dev	% HCVAP 13-17ACS	% WCVAP 13-17ACS	% BCVAP 13-17ACS	% ACVAP 13-17ACS	% HBACVAP 13-17ACS
1	29761	0.36%	7.31%	46.13%	30.69%	11.98%	50.03%
2	32804	-4.77%	6.81%	47.38%	39.05%	4.17%	50.04%

Note: 13-17ACS - 2013-2017 5-Year ACS

Source: U.S. Census Bureau 2013-2017 5 Year ACS Block Group data, Maptitude for Redistricting Illustrative Plan

13. The above "Table 7" (from his report) derives his working results, which I show below in Table 1. My source of his working results is page 68 in "Fairfax Virginia Beach City Council Illustrative Plan Appendices 7.5.19". Mr. Fairfax's two demonstrative districts are identified in Table 1 as "01" and "02".

Table 1. Fairfax's Demonstrative Districts

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
District	CVAP17	Deviation	% Deviation	HCVAP17	% HCVAP17	WCVAP17	% WCVAP17	BCVAP17	% BCVAP17	ACVAP17	% ACVAP17	HBACVAP17	% HBACVAP17
01	29761	157	0.36%	2176	7.31%	13730	46.13%	9135	30.69%	3566	11.98%	14888	50.03%
02	32804	-2090	-4.77%	2235	6.81%	15543	47.38%	12810	39.05%	1367	4.17%	16415	50.04%
03	31960	-156	-0.36%	2542	7.95%	17346	54.27%	7413	23.19%	3403	10.65%	13365	41.82%
04	33802	830	1.90%	1839	5.44%	22251	65.83%	6068	18.04%	2684	7.94%	10612	31.39%
05	34689	-521	-1.19%	1911	5.51%	26622	76.74%	4042	11.65%	1182	3.41%	7133	20.56%
06	34447	474	1.08%	1899	5.51%	25733	74.70%	4107	11.92%	1431	4.15%	7430	21.57%
07	35686	1073	2.45%	1150	3.22%	29635	83.04%	3279	9.19%	799	2.24%	5228	14.65%
08	33660	-504	-1.15%	2522	7.49%	22645	67.28%	5319	15.80%	1815	5.39%	9658	28.69%
09	32843	-833	-0.99%	2417	7.36%	22753	69.28%	5572	16.97%	878	2.67%	8863	26.99%
10	34848	1174	2.68%	1532	4.40%	26347	75.61%	4353	12.49%	1675	4.81%	7559	21.69%

Note: Variables with 17 suffix denote 2013-2017 5-Year ACS; HBAWCVP17 includes Hispanic, Black, and Asian CVAP plus Black and White CVAP mixed persons

Source: Maptitude for Redistricting District Statistics window using U.S. Census Bureau 2010 Census Data and 2013-2017 5-Year ACS Data

14. Each of the districts featured in Table 1 is composed of individual census *blocks*. The numerical values for each block are not published by the Census Bureau; those values must be derived from the Bureau's published *block group* data (from a special tabulation provided at the request of the US Department of Justice). A census *block* typically includes from zero to several hundred persons; a census *block group* typically encompasses 1,100 persons in two or more census blocks. While there is no one "right" way of deriving these estimates, there are several wrong ways of doing so. A common hallmark of the latter is the appearance of alarming logical inconsistencies among the values for individual census blocks.

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15. Demographers favor a methodology that the US Census Bureau itself uses (referred to simply as "raking") for preparing subnational population estimates by demographic characteristic. "Raking" is a particular application of Iterative Proportional Fitting (IPF).[1]

16. I undertook an evaluation of the quality of the block-level estimates which Mr. Fairfax used to construct his two demonstrative districts. I discovered numerous inconsistencies in his census block-level data. Those inconsistencies lead me to conclude that his derivation method has produced flawed census block data. His flawed data overstate the actual minority share of CVAP in each of his two demonstrative districts shown in col. 14 of Table 1 (D-01: 50.03% and D-02: 50.04%). Although the distortions themselves are quite small, they are alarming in that they show fundamental logical inconsistencies, which signify a defective and unreliable dataset. These defects (shown below in Table 2) are irrefutable. In my opinion, these defects render the dataset untrustworthy for drawing any scientifically reliable conclusions.

Inconsistencies in Census Block Data Mr. Fairfax Used to Form His Two Demonstrative Districts

17. The data in Table 2 below illustrate the basis for my concerns. There I show the actual census block-level data that Mr. Fairfax reports having used to form his two proposed demonstrative districts ("01" and "02" shown in Table 1 above). It is these block-level data that Mr. Fairfax used to calculate the district-level percentages he shows in col. 14 of Table 1 ("%HBACVAP17").

18. For the individual census blocks shown in Table 2, his own data enable me to compare the total citizen voting age population (corresponding to totals shown Table 1, col. 2: "CVAP17") with the sum of its separate parts. For each row of data in Table 2, I compared the value shown in col. 2 for "CVAP17" ("Citizen Voting Age Population") with the value that results from summing the corresponding values shown for:

   col. (5): "HCVAP17" ("Hispanic CVAP")
          plus col. (7): "WCVAP17" ("nonHispanic White Alone CVAP")
          plus col. (9): "BCVAP17" ("nonHispanic Black Alone CVAP")
          plus col. (11): "ACVAP17" ("nonHispanic Asian Alone CVAP"),

which I show in col. (c) of Table 2.

19. Simple logic dictates that the number in col. (c) of Table 2 cannot exceed the number in col. (b). Yet it does, according to Mr. Fairfax's own data, in at least 27 instances which I have highlighted in yellow.

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Table 2. Logical Impossibilities Detected in Fairfax's Census Block Data

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
Census Block	CVAP17	HCVAP17+ WCVAP17+ BCVAP17+ ACVAP17	HCVAP17 (Hispanic)	WCVAP17 (White alone NonH)	BCVAP17 (Black alone NonH)	ACVAP17 Asian alone NonH)	TOTAL17 (Total Population)
518100402002004	1143	1146	174	433	499	40	1278
518100454065002	1085	1092	106	446	437	103	2035
518100404023008	656	663	66	218	324	55	942
518100460102005	634	654	48	394	197	15	1001
518100462201020	579	583	35	257	268	23	738
518100454052003	555	560	78	286	186	10	825
518100460153005	551	556	45	306	160	45	779
518100462041017	502	516	17	427	46	26	659
518100462042030	480	537	29	395	76	37	586
518100462201027	446		21	195	204	11	444
518100458063000	411	414	15	153	227	19	529
518100454063004	388	398	22	185	144	47	561
518100462161003	355	367	21	236	67	43	498
518100460143007	351	367	20	191	114	42	516
518100460123002	326	338	15	168	64	91	419
518100454063002	323	324	15	153	119	37	510
518100460131023	295	306	43	154	81	28	310
518100404042050	270	300	32	185	40	43	263
518100462212003	268	276	22	103	144	7	390
518100462203001	241	247	21	61	153	12	289
518100460132003	234	239	20	88	105	26	368
518100404044003	182	188	0	58	96	34	247
518100402001031	176	193	17	103	73	0	329
518100404043004	174	188	13	88	65	22	247
518100458094005	152	155	0	108	31	16	264
518100460093003	126	139	6	97	28	8	141
518100460101010	119	124	9	107	8	0	155
518100460142005	117	122	20	60	20	22	168
518100404022009	17		1	2	12	0	16
518100402003006	14		0	2	10	0	12
518100454053004	4		0	3	0	0	3

(These 27 instances of an obvious logical impossibility are merely ones I spotted through a cursory inspection of his data.)

20. Furthermore, simple logic dictates that the Citizen Voting-Age Population of a census block appearing in col. (b) cannot exceed the Total Population appearing in col. (h). Yet it does, according to Mr. Fairfax's own data, in at least 5 instances which I have highlighted in red.

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21. Clearly, these logical impossibilities cast doubt on the very method Mr. Fairfax used to allocate published block group data to individual census blocks.[2] In my opinion, these defects render the entire dataset untrustworthy for drawing any scientifically reliable conclusions.

Mr. Fairfax's Faulty Interpretation of the Measure Derived from His Defective Dataset

22. The razor-thin purported majorities highlighted in col. 14 ("HBACVAP17") of Table 1 are *point estimates*: 50.03% and 50.04%.   In statistical terms, a "point estimate" is the best estimate of an actual underlying value (assuming the dataset itself is free of defects). To illustrate: A digital thermometer that registers the outdoor temperature in whole-number degrees ("49", "50", "51", ...) is reporting a point estimate. Strictly speaking, the point estimate of "50" means "between 49.51 and 50.49".

23. Likewise, statistical reasoning dictates that the point estimates shown in Table 1 ("50.03%" and "50.04%") connote the *range* that surrounds each point estimate itself. One calculates that corresponding range from the associated margin of error (MOE), which accompanies each point estimate. This MOE governs the scientific interpretation of the point estimate.[3] Point estimates and MOEs derive from the American Community Survey.

24. Mr. Fairfax has disregarded the insurmountable barrier presented by his razor-thin majority point estimates (50.03% and 50.04%). The MOEs here undermine his ability to make a claim about the minority population with any reasonable scientific certainty.

25. Even assuming that Mr. Fairfax's flawed data allowed him to estimate the minority population accurately, neither he nor any other expert can estimate with any reasonable scientific certainty whether or not Hispanics plus Blacks plus Asians are a majority of the CVAP in either district."

My Independent Replication of Mr. Fairfax's Calculations

26. As a final check, I replicated Mr. Fairfax's aggregation of block-level data in forming his two proposed districts. I used his own GIS shape files to allocate his own defective block-level data among districts. The results I obtained are shown in Table 3 below. By my calculations, Mr. Fairfax should have obtained combined three-group minority shares of CVAP that are fractionally lower than those he has reported. Specifically, I obtain 49.99% for his District 1 (vs. his 50.03%) and 49.96% for his District 2 (vs. his 50.04%). Assuming my calculations to be correct, the point estimates themselves merely round *up* fractionally to 50.0% (rather than *down* to 50.0%).

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[2] This is not the first instance in which I have chanced upon a testifying expert whose faulty methodology has rendered an unsound opinion based upon a defective dataset. See SUPPLEMENTAL EXPERT REPORT OF PETER MORRISON, Ph.D. in Montes v. City of Yakima, April 8, 2013, paragraphs 4-14.

[3] As a commonplace example, suppose a survey of 500 adult city residents asks them: "Are you a registered voter?" The result (51% "yes"; 49% "no") is accompanied by "+/- 3%". The analyst uses this latter statistic to gauge the level of confidence in concluding that (for example) "yes's" comprise "50% or more" of all adults citywide. Specifically, "51% (+/- 3%)" dictates the following interpretation: "One can conclude that the true percentage lies somewhere between 48% and 54%, with reasonable scientific certainty. "Reasonable" here would imply a recognized scientific standard (e.g., "with 90% confidence"). Correctly stated, my conclusion here would be: "We know with reasonable scientific certainty that the 51% point estimate means that the true percentage of all adults citywide who are registered to vote could be as low as 48%."

Table 3. Minority Shares of CVAP Using Correct CVAP Data

Minority Share of CVAP in Fairfax's Proposed Districts 1 and 2 (based upon corrected 2013-17 CVAP data)							
Fairfax's Proposed District	TOTAL CVAP	White NonHisp	Black NH	Asian NH	Hispanic	Blk+Asn+ Hispanic	B+A+H Share
1	29,766	13,723	9,136	3,598	2,145	14,879	49.99%
2	32,804	15,564	12,794	1,361	2,234	16,389	49.96%
Rest of V.B. City	271,930	193,391	40,195	13,845	15,848	69,888	25.70%
Source: Morrison's ACS block data derived through iterative porportional fitting (IPF).							

27. By both of our calculation, then, his defective dataset yields virtually identical B+A+H shares--essentially "50.0%".   Based upon my data or his, the likelihood of a majority is about 50-50, comparable to the flip of a coin.

28. All conclusions contained above in my Report are to the reasonable degree of scientific certainty (at least 90% certain) that scholars and experts in my field use.

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STATEMENT OF COMPENSATION:

I am being compensated at a rate of $250 per hour for time spent assembling and analyzing data, drafting memos/reports/declarations, conferring with the attorney or client, and related work. I will be compensated at a rate of $400 per hour for all time spent testifying by deposition or at trial.

Signed:

Peter A. Morrison
August 12, 2019

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Appendix A

Peter A. Morrison, Ph. D.

CASES IN WHICH I HAVE TESTIFIED AT TRIAL OR BY DEPOSITION SINCE AUGUST 2012

1. ZORAIDA RIOS-ANDINO et al. v. ORANGE COUNTY. UNITED STATES DISTRICT COURT, MIDDLE DISTRICT OF FLORIDA, ORLANDO DIVISION. Expert Report on behalf of Defendant.

2. JAMES FIGGS AND ROBERT JACKSON v. QUITMAN COUNTY, MS. UNITED STATES DISTRICT COURT, NORTHERN DISTRICT OF MISSISSIPPI, GREENVILLE DIVISION. Affidavit in Support of Defendants' Motion for Summary Judgment.

3. Montes and Arteaga v. City of Yakima, WA. U.S. District Court, Eastern District of Washington. Deposition and trial testimony on behalf of Defendant.

4. U.S. v. TOWNHOMES OF KINGS LAKE, HOA, INC. et al. MIDDLE DISTRICT OF FLORIDA. DJ# 175-17M-499. Declaration on behalf of Plaintiff U.S. Department of Justice.

5. EVENWEL v. PERRY, U.S. DISTRICT COURT FOR THE WESTERN DISTRICT OF TEXAS. Declaration on behalf of Plaintiffs seeking to enjoin Texas from conducting further state Senate elections under Plan S172 and asking the court to require the Texas Legislature to reapportion state senatorial voting districts in conformity with the Fourteenth Amendment.

6. EVENWEL et al. v. ABBOTT et al., UNITED STATES SUPREME COURT. "Brief of Demographers Peter A. Morrison, et al. as *Amici Curiae* in Support of Appellants," in Evenwel et al. v. Abbott et al.

7. PAULETTE KREMMEL v. FAIRLIFE LLC, UNITED STATES DISTRICT COURT, SOUTHERN DISTRICT OF ILLINOIS. Declaration on behalf of Defendant.

8. DR. PANKAJ JAIN, Plaintiff v. COPPELL INDEPENDENT SCHOOL DISTRICT, et al., U.S. District Court, Northern District of Texas, Dallas Division. Declaration on behalf of Defendant.

9. Glatt v. City of Pasco, et al., U.S. District Court, Eastern District of Washington. Declaration on behalf of Defendant. (Court ruled in favor of Defendant)

10. Bishop, et al. v. Shorter University, Inc., Civil Action No. 4:15-CV-0033-HLM, United States District Court for the Northern District of Georgia, Rome Division. Declaration on behalf of Defendant.

11. Feldman et al. v. Arizona Secretary of State's Office et al., United States District Court, District of Arizona. Declaration on behalf of Defendant.

12. Timothy Dadey et al. v. City of Costa Mesa, Case No. 30-2014-00757962-CU-CR-CJC and Timothy Dadey et al. v. City of Costa Mesa, Case No. 30-2014-00758104, pending in the Superior Court of the State of California for the County of Orange. Deposition testimony.

13. Anne Harding et al. v. County of Dallas, Texas et al. U.S. District Court, Northern District of Texas, Dallas Division. C.A. No. 3: 15-CV-00131-D. Deposition and trial testimony on behalf of Plaintiffs.

14. Pico Neighborhood, et al. v. City of Santa Monica, et al. Superior Court of the State of California for the County of Los Angeles, No. BC616804. Deposition and trial testimony on behalf of Defendant.

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15. Joseph Thomas et al. v. Phil Bryant et al., Civil Action No. 3: 18cv 441-CWR-FKB in United States District Court for the Southern District of Mississippi, Northern Division. Deposition and trial testimony on behalf of Defendants.

16. S&R Development Estates, LLC v. Town of Greenburgh et al. in United States District Court, Southern District of New York. Declaration on behalf of Defendant.

(Updated: August 7, 2019)

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Appendix B

Peter A. Morrison
C. V. and PUBLICATIONS

EDUCATION

B.A., Sociology, 1962, Dartmouth College
Ph.D., Sociology, 1967, Brown University

PROFESSIONAL EXPERIENCE

2009-present — President, Peter A. Morrison & Associates, Inc., Nantucket, MA
1969-2009 — Senior Staff Demographer and Resident Consultant, The RAND Corporation, Santa Monica, California
1979-1990 — Founding Director, Population Research Center, RAND
1967-1969 — Assistant Professor, Department of Sociology, and Research Associate, Population Studies Center, University of Pennsylvania, Philadelphia

AREAS OF EXPERTISE

Dr. Morrison's principal expertise centers on applications of demographic analysis in tracking socioeconomic trends and envisioning their consequences for public policy and business.

Domestic applications include demographic analysis for electoral redistricting; store site selection; human resource analysis; evaluating employment discrimination claims, minority representation within jury pools, and school desegregation remedies; forecasting school enrollments; and using census and administrative data to monitor local community demographic contexts.

International applications include business concerns with corporate strategic planning, globally emerging middle-class consumer markets, and demographic precursors of expanding consumer markets; comparing and evaluating individual markets; and identifying potential business opportunities spurred by forthcoming demographic change.

Dr. Morrison conducts studies for the private sector and offers executive briefings on these topics through his consulting firm, founded in 1984. Clients have included American Express, American Stores, Corning, Inc., Ford Motor Co., Marriott International, NBC, New Directions for News, Times Mirror, University of California, and CIBC Securities (Canada).

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Previously, Dr. Morrison was a faculty member at the University of Pennsylvania. He also has taught periodically at UCLA, the RAND Graduate School, and the Helsinki School of Economics. He also lectures before academic and business audiences and gives invited testimony before subcommittees of the U.S. Senate and House of Representatives. He has made invited presentations to the National Science Board, the Conference Board, the National League of Cities, the National Conference of State Legislatures, the University of California Management Institute, the American Bar Association, American Society of Newspaper Editors, newsroom seminars for the Casey Journalism Center, County Counsels Association of California, American College of Surgeons, National Association of Homebuilders, Missouri Legislative Forum, World Future Society, and Volunteers of America.

He has served as advisor to the Committee for Economic Development, the Congressional Research Service, and committees of the National Academy of Sciences, U.S. Census Bureau, Department of Agriculture, National Institutes of Health, California Energy Commission, California Governor's Council on Growth Management, Center for California Studies, and United Way.

PROFESSIONAL ORGANIZATIONS/HONORS

Invited participant, U.S. Census Bureau Working Group on 2010 Race and Ethnicity

Member, L.A. Unified School District Enrollment Analysis Technical Advisory Committee

Visiting Lecturer, Helsinki School of Economics and Business Administration, summer 2001

U.S. Census Bureau Advisory Committee on Population Statistics, 1989-1995 (Chair, 1990).

Population Association of America: Board of Directors, 1978-1980; Public Affairs Committee, 1979-1986; Chair, Nominations Committee, 1981-1982; annual Program Organizing Committee, 1995, 1998; Local Arrangements Committee, 2000; Committee on Applied Demography, 1995-1999, Chair, 1998; Development Committee, 2006-2012.

Southern Demographic Association: Board of Directors, 1999-present; Vice President, 2001; President, 2003.

International Association of Applied Demographers (officer)

Center for Spatially Integrated Social Science, UC Santa Barbara: Advisory Board, 2000-

Research Advisory Board, Committee for Economic Development, 1988-1991.

Regents' Lecturer, UCLA, Spring 1987.

Social Science Research Council's Committee on the Survey of Income and Program Participation, 1985-1988.

National Advisory Child Health and Human Development Council, National Institute of Health, 1984-1987.

Population Research Committee, National Institute of Child Health and Human Development, 1977-1979.

Committee on Behavioral and Social Aspects of Energy Consumption and Production, National Academy of Sciences, 1980-1982.

Committee on Urbanization and Population Redistribution, International Union for Scientific Study of Population, Chairman, 1976-1979.

Advisory Subcommittee for Applied Social and Behavioral Sciences, National Science Foundation, 1978-1981.

Future of Rural America Advisory Committee, FHA, 1978-1981.
Editorial Advisory Committee, *Urban Studies,* 1985-1995.
Editorial Advisory Board, *J. Australian Population Assoc., 1995-1998.*

RECENT MEDIA APPEARANCES/COVERAGE:

Interviews: CNBC; New York Times; Los Angeles Times; USA Today; Time Magazine; Seattle Times; AMA/Marketing News

Commentary: New York Times; Wall Street Journal; Washington Post; International Herald Tribune; Pittsburgh Post-Gazette; Los Angeles Times; Atlanta Constitution; Houston Chronicle; San Jose Mercury News; Providence Journal; San Antonio Express-News

Articles: "United Nations of Nantucket," *N Magazine* (Winter 2016).
(access at: www.n-magazine.com/united-nations-nantucket/)

RECENT PRESENTATIONS:

- 01/24/2019: **"Big Data for a Small Island,"** lunch hour talk at Nantucket Saltmarsh Center
   https://www.youtube.com/watch?v=ZqqJ9STcMwE

- 10/13/2016: "A Demographic Accounting Model for Class Action Litigation," presented at 2016 Southern Demographic Association meetings, Athens, GA. (coauthored with Thomas Bryan).

- 10/22/2015: At Nantucket Historical Association's "Food for Thought" series:
   "Immigration on Nantucket: What You Should Know"
   https://www.youtube.com/watch?v=u17rINVweZs (Morrison presentation starts at minute 2:10)

- 01/08/2015: To Waterbury, CT **"Alderman by District Reapportionment Commission"** Meeting
   https://www.youtube.com/watch?v=aj6qE3JECg0&feature=youtu.be
   (Morrison presentation start at minute 23:10)

- 01/14/2015: To Waterbury, CT **"Aldermen by District Reapportionment Commission"** meeting:
   https://www.youtube.com/watch?v=98Vp4y11_sc (Morrison presentation starts at minute 9:10)

- 12/2014: **"Investing in Nantucket's Future"** http://vp.telvue.com/preview?id=T02542&video=223735
   (Morrison presentation starts at minute 1:30)

- 11/2013: **"Growing Old: How Aging Populations Will Transform Our Lives and Times"**
   http://www.youtube.com/watch?v=kJvS_hhgLDk&feature=c4-overview-
   vl&list=PLjgJVmnztYsTqYVn_ijBhCGxA5-7DMtGw (Morrison presentation starts at minute 1:05)

BOOKS

Morrison, P. A. and T. M. Bryan, *REDISTRICTING: A Manual for Analysts, Practitioners, and Citizens* (Springer, forthcoming 2020).

Morrison, P. A., ed. *A Taste of the Country: A Collection of Calvin Beale's Writings* (Penn State Univ. Press, 1990).

Morrison, P. A., co-ed. *Demographics: A Casebook for Business and Government* (Westview Press, 1994). Access at: https://www.rand.org/pubs/monograph_reports/MR904.html

Morrison, P. A., ed. *Population Movements: Their Forms and Functions in Urbanization and Development* (IUSSP, Ordina Editions, Liege, Belgium, 1983).

Morrison, P. A. *Demographic Information for Cities: A Manual for Estimating and Projecting Local Population Characteristics* (Santa Monica, CA: RAND Corporation, R-618, 1971). Access at: https://www.rand.org/pubs/reports/R0618.html

SELECTED PUBLICATIONS/PAPERS/POLICY BRIEFS/OP-EDs

Most of my publications (or abstracts) are accessible at these sites:

https://www.researchgate.net/profile/Peter_Morrison2/publications?sorting=newest&page=2

www.rand.org/pubs/authors/m/morrison_peter_a.html

"Sanctuary Cities Get a Census Bonus," op-ed in *The Wall Street Journal*, July 16, 2019.
https://www.wsj.com/articles/sanctuary-cities-get-a-census-bonus-11563318817?fbclid=IwAR3Ygf2TAeqLjsUc_hbu3GS1775Zd9iGG3dIgWcMF1DQPv95jsTFBPtdHOY

"Small-Area and Business Demography" (coauthor) Chapter 31 in Dudley L. Poston, Jr. (editor). *Handbook of Population*. 2nd edition. Cham, Switzerland: Springer Nature.

"A border wall won't stop people from coming here illegally," op-ed in *The Bryan-College Station (TX) Eagle*, March 19, 2019 (co-author). *Access at:*
https://www.theeagle.com/opinion/columnists/a-border-wall-won-t-stop-people-from-coming-here/article_5b5e7216-4551-582c-9e82-0f5adf37896d.html

"Demographic Approaches to Unveiling a Partisan Gerrymander," presented at the 2019 Population and Public Policy Conference, Albuquerque, NM.

"Estimating Nantucket's Effective Population," under review by *Population Research & Policy Review* (coauthor).

"Small-Area and Business Demography," chapter in D. Poston, ed., *Handbook of Population* (Springer, 2019), coauthored with Stan Smith & Thomas Bryan.

"Distinguishing 'False Positives' Among Majority-Minority Election Districts in Statewide Congressional Redistricting," 2017 Southern Demographic Association meetings (coauthor).

"A Comparison of Methods for Classifying and Modeling Respondents Who Endorse Multiple Racial/Ethnic Categories: A Healthcare Experience Application," (coauthor) *Medical Care* (2019) *Access at:* https://www.ncbi.nlm.nih.gov/pubmed/30439794

"Can Puerto Ricans Spark a Latino Political Backlash?" op-ed in *San Antonio Express-News*, February 13, 2018 (coauthored with Charles S. Bullock, III).
Access at: https://www.researchgate.net/publication/323200663_Can_Puerto_Ricans_spark_a_Latino_political_backlash

"Focus on Teaching: The Legend of the Calamity-Induced Baby Boom," PAA Affairs, Spring 2017. *Access at:* https://www.researchgate.net/publication/315683457_Focus_on_Teaching_The_Legend_of_the_Calamity-Induced_Baby_Boom

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(coauthored with Dudley L. Poston, Jr.).
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"From Legal Theory to Practical Application: A How-To for Performing Vote Dilution Analysis,"
Social Science Quarterly (2017), coauthor.
Assess at: https://www.researchgate.net/publication/315631377_From_Legal_Theory_to_Practical_Application_A_How-To_for_Performing_Vote_Dilution_Analyses_From_Legal_Theory_to_Practical_Application

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Assess at: https://www.researchgate.net/publication/311486631_Foreward_to_The_Frontiers_of_Applied_Demography_2017

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(coauthored with Ron Cossman).
Access at: https://www.researchgate.net/publication/309458235_Health_Care_Access_The_Hollow_Promise

"We have the data to make voting fair. Let's use it." op-ed in *The Washington Post,* 10/22/2015
Access at: http://www.washingtonpost.com/news/in-theory/wp/2015/10/22/we-have-the-data-to-make-voting-fair-lets-use-it/

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Institute as *Amici Curiae* in Support of Appellants," in Evenwel et al. v. Abbott et al.
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(Updated: 07/27/2019)

Expert Report of Anthony E. Fairfax

Response to Peter Morrison's Report

Anthony E. Fairfax

16 Castle Haven Road

Hampton, VA 23666

August 26, 2019

1

I. Introduction

I have been retained by counsel representing the Plaintiffs in this lawsuit *(Holloway, et al v City of Virginia Beach et al)* to determine whether it is possible to draw an Illustrative Plan with one or more majority Latino (Hispanic), Black, and Asian ("HBA") combined districts in the City of Virginia Beach, VA. In addition, I was also asked to review past and recent demographics pertaining to the city.

This additional report serves as a response to Dr. Peter A. Morrison's report (dated August 12, 2019) which evaluated my initial July 15th report expert report.

My qualifications can be found in my prior expert report and I am being compensated at a rate of $180 per hour.

II. Background

The City of Virginia Beach, VA currently has an eleven-member City Council structure. Three (3) Council members and the Mayor serve "at large" with no district residency requirement. The other seven (7) council members are required to live in the district that they represent. However, all city council members are elected at large and <u>not</u> within the district that they represent.

On July 15, 2019 I submitted an expert report for this case that presented my finding that the minority population in the city of Virginia Beach, Virginia was sufficiently large and geographically compact to constitute two majority Hispanic, Black, and Asian ("HBA") combined districts. On August 12, 2019, Dr. Peter A. Morrison submitted his evaluation of my initial expert report.

III. Summary of Dr. Morrison's Findings and Response

The report of Dr. Morrison outlines several disagreements with my initial report. The first is that he claims the Illustrative Plan's majority minority districts' Total HBA Citizen Voting Age Populations ("CVAP") do not constitute a majority. Using an Iterative Proportional Fitting (IPF) technique, he calculates the CVAP of the two districts as 49.9% (District 1) and 49.6% (District 2) versus my calculations of 50.03% for District 1 and 50.04% for District 2. The second disagreement centers around alleged inconsistences in the census block data reflecting the CVAP values. Finally, his last disagreement with my initial report lies with the use of Hispanic, Black and Asian populations combined. He states that this presumes that political cohesiveness exists between Hispanics, Blacks, and Asians. I address each of Dr. Morrison's claims below.

Dr. Morrison's three claims pertaining to my initial report are incorrect, and do not change my conclusions in this case. First, several illustrative plan districts that significantly exceed a majority (50%) of CVAP can be drawn, and the initial Illustrative Plan was shown to further exceed 50% CVAP when the addition of the Black and White combined race category data is included (51.11% and 51.08% for District 1 and 2, respectively).[1] Several alternative plans were found to exceed 50% by almost 6% (55.7%) for District 1 and almost 3% (52.7%) for District 2.

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[1] The Black and White race category includes those persons who select both Black (or African American) and White race categories on the census survey form.

A single majority HBA district was also developed that exceeded 50% by more than 8% (58.9%). These alternative plans clearly verify that at least one majority HBA CVAP district can be developed and developed to eliminate any "point" estimate issues.

Dr. Morrison's claim of inconsistent data is inaccurate and irrelevant. If districts were made up of a few census blocks, Dr. Morrison's point might carry more weight. However, the Illustrative Plan's districts and alternative plans' districts are made up of hundreds of census blocks, which diminishes the census block data variations to virtually nil. The change in final district's HBA CVAP percentages were found to be extremely small and, in most cases, significant only to the third decimal place.

Finally, Dr. Morrison's claim that I presume cohesiveness among Hispanic, Black, and Asian voters was simple to address, since considering it is not part of the *Gingles* first prong precondition, and thus is not analyzed in this report. Also, the data indicates that the Hispanic, Black, and Asian populations tend to reside in the same communities. This analysis was shown in my initial expert report, is unrebutted by Dr. Morrison, and is reiterated in this response report.

Despite Dr. Morrison's claims, the HBA population in Virginia Beach is sufficiently large and geographically compact to constitute a majority in two single-member districts that would likely be able to elect their candidates of choice.

Although Dr. Morrison may prefer the IFP method for disaggregation, the Maptitude method of disaggregation that I used is also a commonly used and reliable technique that produces accurate results. Further, when black and white combined data is considered, Districts 1 and 2 in the Illustrative Plan have even higher CVAP percentages.

In addition to the Illustrative Plan that I included in my initial report, it is possible to draw a number of additional alternative plans with two majority HBA CVAP districts. When analyzing all of the plans using total population, VAP, and CVAP, there are only two instances where the HBA percentage are below 50% (Both of these instances are using 2010 VAP data that were surveyed years ago (the Illustrative Plan and Alternative 4 plan)).

It is also possible to draw plans with at least one HBA majority CVAP district, which is still more than contained in the current City Council plan (which has zero). It is also possible to draw a majority Hispanic and Black CVAP district.

Dr. Morrison's conclusion about the inconsistent disaggregation of data at the census block level is meritless in practice. The Illustrative Plan's districts consist of hundreds of census blocks, which diminishes any variation from the disaggregation process, and the differences are minute with no practical impact on my results or conclusions.

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IV. Response to Dr. Morrison's Claim Regarding CVAP of Districts 1 and 2 in Illustrative Plan

Dr. Morrison's claim that the Illustrative Plan's Districts 1 and 2 do not have a majority HBA CVAP relies on his use of an alternative disaggregation method, Iterative Proportional Fitting ("IPF"), that he alleges results in CVAP values of 49.99% for District 1 and 49.96% for District 2. He also argues that the majority HBA CVAP percentages of 50.03% (District 1) and 50.04% (District 2) that I report are "point estimates" and "razor-thin."

First, it is important to note that assuming that Dr. Morrison's IPF disaggregation process is correct, it only yields a difference of .04% for District 1 and .08%. for District 2.[2] These amounts on their face are extremely negligible, especially when considering that two different techniques were used. Dr. Morrison's calculated amounts also clearly round to 50%. Further, the Maptitude disaggregation process that I utilized is a commonly used and accepted method in the field, and it provides accurate estimates.[3] However, even if Dr. Morrison calculated his estimates correctly and even if his preferred method for disaggregation were accepted, his point is also ultimately irrelevant, because it is possible to produce a number of additional alternative plans with two majority HBA CVAP districts with higher percentages.

In addition, the initial Illustrative Plan's HBA CVAP percentages for District 1 and District 2 are higher when considering the Black and White combined race categories, as presented on page 21 and Appendix D of my initial report, and Table 1 below. District 1 increases to 51.11% while District 2 increases to 51.08% (see Table 1). Given the small differences (.04% and .08%) in the two disaggregation processes, if Dr. Morrison added the Black and White race categories using the IPF techniques, his calculations should yield similar outcomes to the ones that I obtained. Consequently, adding Black and White race categories, Districts 1 and 2 clearly exceed 50% majority-minority HBA CVAP.

Table 1 – Illustrative Plan - HBA & HBA plus B/W using CVAP (2013-17 ACS)			
District	**CVAP 13-17ACS**	**HBA CVAP 13-17ACS**	**HBA CVAP plus Black/White 13-17ACS**
1	29761	14888	15210
2	32804	16415	16755
District	**% CVAP 13-17ACS**	**% HBA CVAP 13-17ACS**	**% HBA CVAP plus Black/White 13-17ACS**
1	29761	50.03%	51.11%
2	32804	50.04%	51.08%

Source: U.S. Census Bureau 2013-2017 5 Year ACS Block Group data, Maptitude for Redistricting Illustrative Plan
Note: 13-17ACS - 2013-2017 5-Year ACS; Black/White included Black and White combined race persons

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[2] Even this amount may be explained due to Dr. Morrison apparently using Total Population as the weighted census block to block group ratio instead of Voting Age Population (VAP) as I used, which is not an apples-to-apples comparison. For the analysis I present here, VAP is the more accurate weighted ratio to use since it is closer to the true citizen voting age population.

[3] Further discussion of Maptitude's disaggregation techniques is included in the section of my report below addressing Dr. Morrison's claim regarding alleged inconsistent census block values (see Section V).

Second, as I mentioned above, the Illustrative Plan is not the only possible way to draw two single-member majority HBA CVAP districts for the city of Virginia Beach, VA. As stated in the conclusions of my initial report, the Illustrative Plan is only demonstrative and a number of other configurations that result in two majority HBA CVAP districts can be drawn. I include three additional plans with two majority HBA-CVAP districts below.

For instance, with only minor changes to the districts, an alternative plan (Alternative 1) can be created with an HBA CVAP percentage of 51.50% for District 1 and 51.63% for District 2 (see Table 2 and Figure 1).[4]

In addition to containing a majority of single race alone HBA CVAP, the HBA CVAP% including persons that identify as *both* Black and White in Districts 1 and 2 in the Alternative 1 plan yields percentages of 52.64% and 52.62% HBACVAP, respectively (see Appendix A).

Table 2 – Illustrative Alternative 1 Plan - Major Race/Ethnicity using CVAP (2013-17 ACS)							
District	CVAP 13-17ACS	Dev	HCVAP 13-17ACS	WCVAP 13-17ACS	BCVAP 13-17ACS	ACVAP 13-17ACS	HBACVAP 13-17ACS
1	28300	-2091	2119	12609	9056	3407	14575
2	32634	-1822	2346	15004	13141	1387	16851
District	% CVAP 13-17ACS	% Dev	% HCVAP 13-17ACS	% WCVAP 13-17ACS	% BCVAP 13-17ACS	% ACVAP 13-17ACS	% HBACVAP 13-17ACS
1	28300	-4.77%	7.49%	44.55%	32.00%	12.04%	51.50%
2	32634	-4.16%	7.19%	45.98%	40.27%	4.25%	51.64%

Note: 13-17ACS - 2013-2017 5-Year ACS
Source: U.S. Census Bureau 2013-2017 5 Year ACS Block Group data, Maptitude for Redistricting Illustrative Plan

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[4] As with the initial Illustrative Plan, the alternative plan's HBA CVAP totals were summed prior to disaggregation, thus minimizing the potential disaggregation error from three (Hispanic, Black, and Asian CVAP summed together) to one HBA CVAP total. This technique minimizes the disaggregation error associated with the totals, specifically when the total is the focal point (as with a majority minority determination). Thus, the disaggregated totals for Hispanic, Black and Asian combined may not add to the HBA CVAP totals. The Total Pop HBA using the 2013-2017 was calculated by summing the three fields together (See Appendix A).
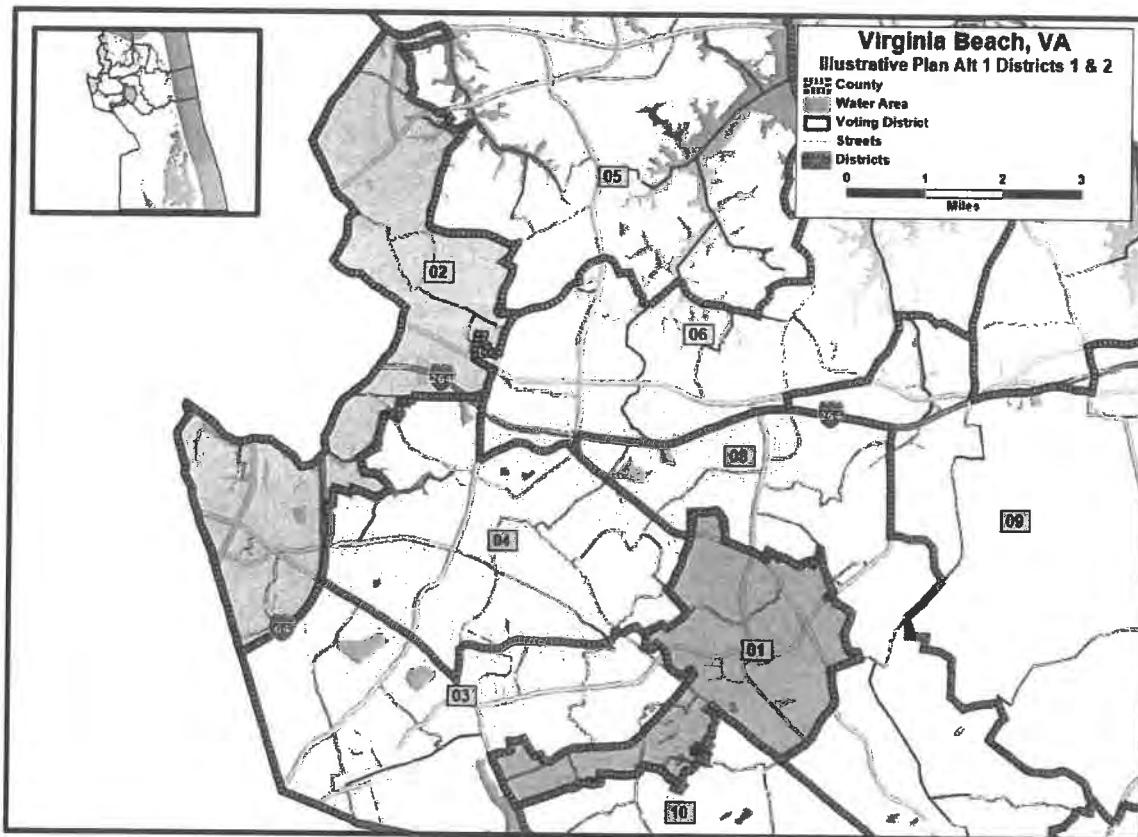
Source: Illustrative Alternative 1 Plan for Virginia Beach, VA using Maptitude for Redistricting

Figure 1 – Virginia Beach Illustrative Alternative 1 Plan with
Two Majority HBA CVAP Districts with slight changes

It is also possible to draw a second alternative plan (Alternative 2) with two single-member
majority HBA CVAP districts, using census block groups only (see Figure 2). Alternative 2 has a
HBA CVAP of 51.04% for District 1 and 51.07% for District 2, respectively (increased to
52.15% for District 1 and 52.12% District 2 when Black and White combined data is
considered). This plan will be discussed further in Section V.

6
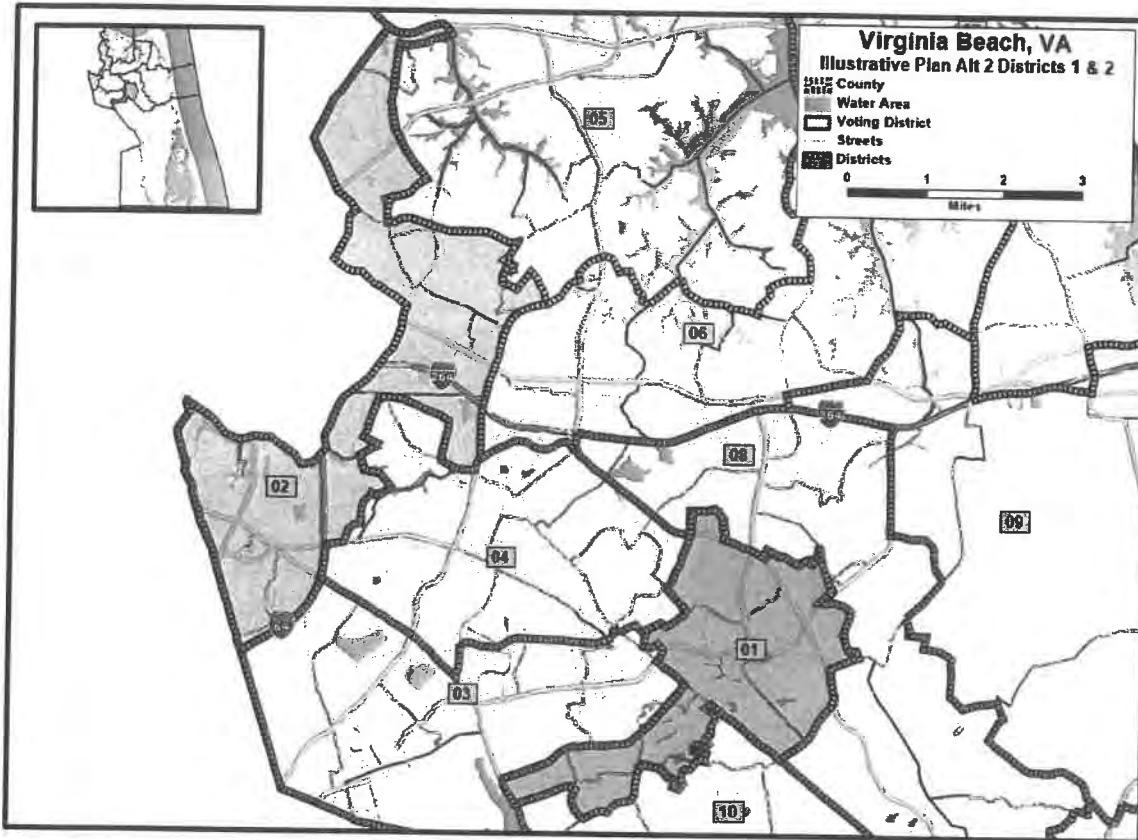
Source: Illustrative Alternative 2 Plan for Virginia Beach, VA using Maptitude for Redistricting

Figure 2 – Virginia Beach Illustrative Alternative 2 Plan with
Two Majority HBA CVAP Districts using Block Groups Only

A third alternative plan (Alternative 3) includes two districts with HBA majority CVAP percentages and encompass different geographic locations than the initial Illustrative Plan (see Figure 3). The total HBA CVAP percentages in Alternative 3 are 54.47% for District 1 and 51.92% for District 2. When the Black and White combined data is considered, the percentages increase to 55.72% for District 1 and 52.75% for District 2.

Alternative 3 also reveals that a Majority Hispanic, Black, and Asian combined district using the 2010 Voting Age Population (VAP) data could have been developed. The HBA VAP in 2010 would have been the likely dataset that would have been used if the city of Virginia Beach chose to develop a majority HBA VAP district during the 2010 redistricting cycle.[5] District 1's VAP in 2010 is 54.05% and District 2 is 51.32% using 2010 VAP census data (see Appendix A).

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[5] The CVAP data that would have also been available during the 2010 redistricting cycle would have been the 2005-2009 5-Year ACS. This dataset would most likely have been too old to use (since it midpoint is 2007) and thus reliance on 2010 VAP would have been more likely.

7
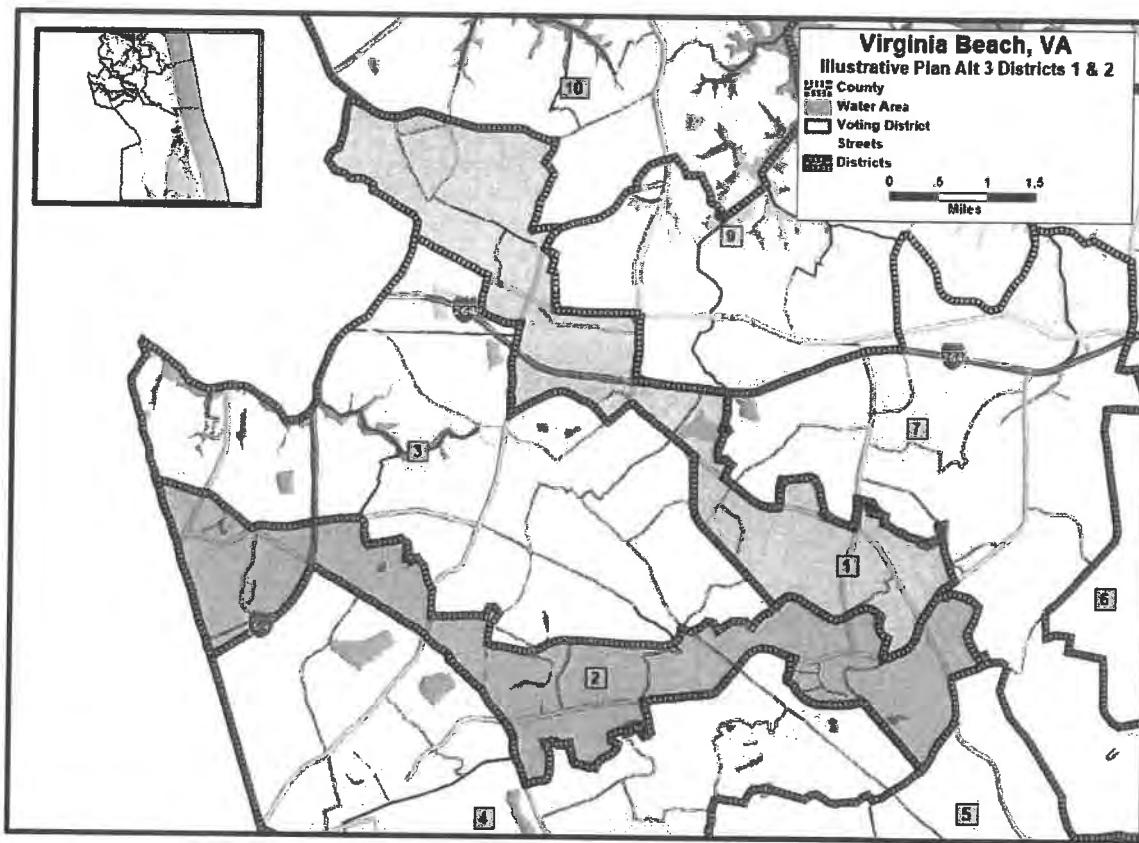
Source: Illustrative Alternative 3 Plan for Virginia Beach, VA using Maptitude for Redistricting

Figure 3 – Virginia Beach Illustrative Alternative 3 Plan with Two Majority HBA CVAP
Districts in different geographic locations

Further, given that it is possible to draw multiple plans with two majority HBA combined CVAP
districts, it is also possible to draw a plan that at the very least contains one majority HBA CVAP
district. The current City Council plan has zero majority HBA combined CVAP districts (see
Appendix D in my initial report). Nothing in Dr. Morrison's report disputes this point. The first
Gingles precondition reads:

"The minority group must be able to demonstrate that it is sufficiently large and
geographically compact to constitute a majority in **a** single-member district."[6]

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[6] *Thornburg v. Gingles*, 478 U.S. 30 (1986)

8

Therefore, as long as at least *one* majority HBA combined CVAP district can be drawn, the first *Gingles* precondition would be satisfied. It is possible to draw several plans with one HBA combined CVAP district, and I include an example, Alternative 4, below.

Alternative 4 (Figure 4) includes a single member district with an HBA CVAP percentage of 50.58% (51.46% with the addition of Black and White combined data). This Majority HBA CVAP district did <u>not</u> split any Voting Tabulation Districts (VTDs).[7]
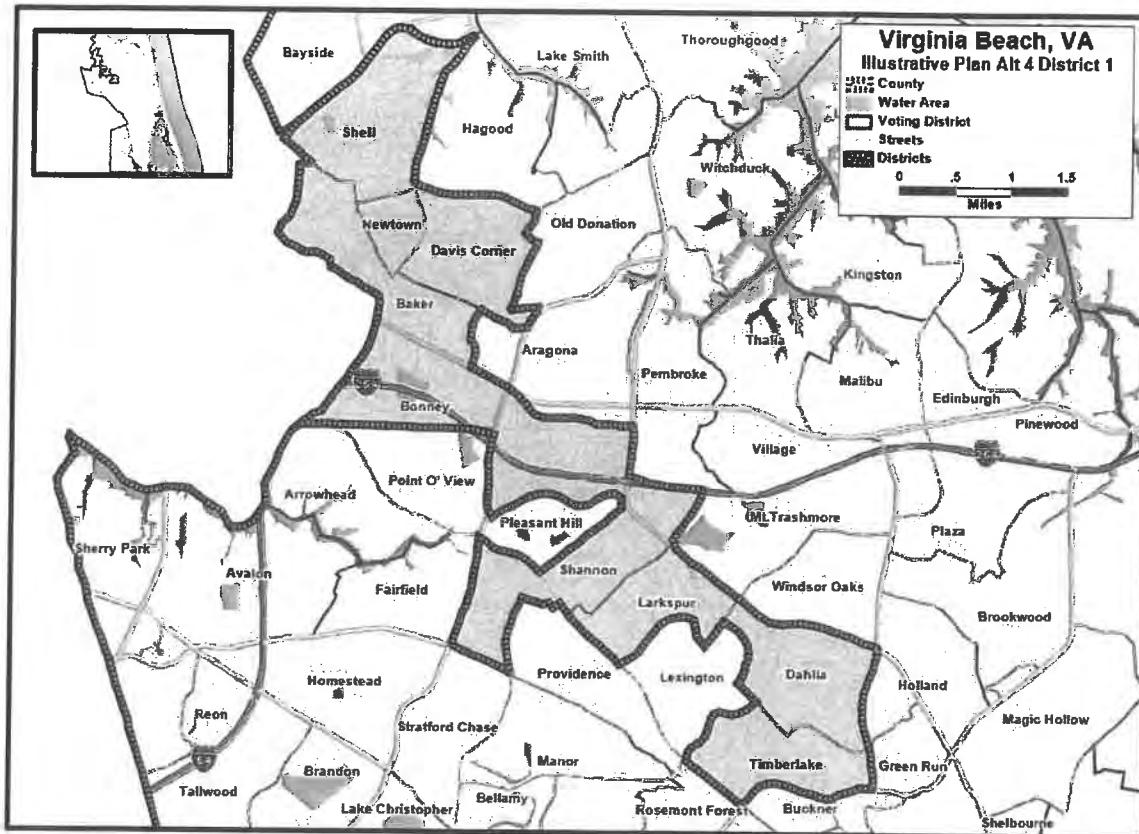
Source: Illustrative Alternative 4 Plan for Virginia Beach, VA using Maptitude for Redistricting

Figure 4 – Virginia Beach Illustrative Alternative 4 Plan with a Majority HBA CVAP District w/No Split VTDs

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[7] Voting Tabulation Districts are generated by the Census Bureau and commonly used synonymously as precincts during the redistricting process. VTDs follow census block boundaries while precincts may not.

9

In addition, although the focus of the analysis was to draw majority Hispanic, Black and Asian combined districts, another plan alternative was generated that verifies that, at a minimum, a majority Hispanic and Black CVAP district can be drawn (see Figure 5). Alternative 5 shows a majority district with a Hispanic and Black CVAP of 51.04%. When Black and White combined data is considered, the district's CVAP increases to 52.17%.[8]
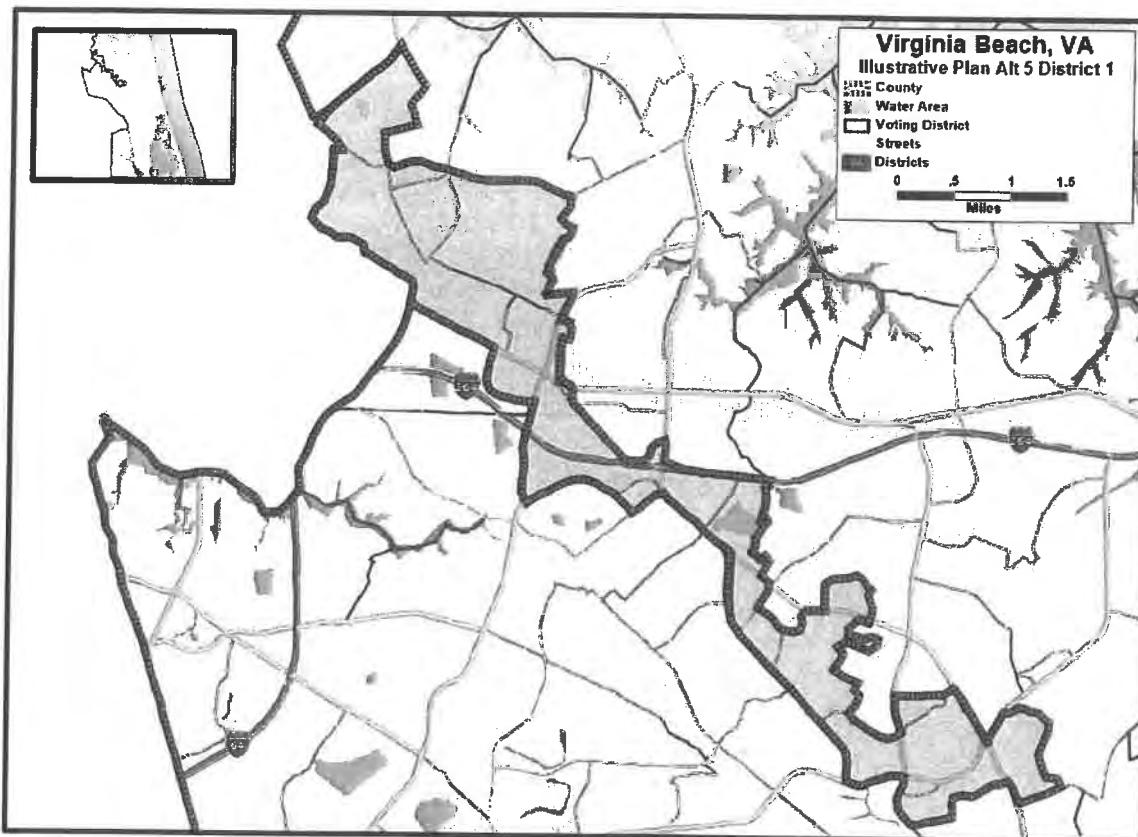
Source: Illustrative Alternative 5 Plan for Virginia Beach, VA using Maptitude for Redistricting

Figure 5 – Virginia Beach Illustrative Alternative 5 Plan with
a Majority Hispanic and Black CVAP District

Finally, the analysis that I performed utilized 2013-2017 5-Year ACS as the most recent data to determine district HBA CVAP percentages. These data as well as the 2010 decennial data provide numbers that occur in the past and not current demographics. Comparing the 2013-2017 5-Year ACS with the 2008-2012 5-Year ACS, the city of Virginia Beach increased 1.55% in its HBA CVAP percentage. The one-year 2017 ACS data for the city shows that there was an additional 1.75% increase in HBA CVAP percentage. Given that the HBA CVAP population in

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[8] Alternative Plan 5 has a HBA CVAP percentage of 57.75% (58.89% with the addition of Black and White race combined data).

10

Virginia Beach has grown considerably over the past two decades and continues to increase, the Illustrative and alternative plans' current HBA CVAP percentages for the majority-minority districts are ultimately likely to be higher than the values shown in this report's analysis.

V. Response to Dr. Morrison's Claim of Inconsistent Disaggregated Data

Dr. Morrison claims that the disaggregated census block data used to generate the total Hispanic, Black and Asian combined CVAP is "untrustworthy." This claim is meritless. Dr. Morrison points to examples where the block level data shows instances where the CVAP is exceeded by the combined values of Hispanic, Black, and Asian CVAP populations. However, the CVAP may exceed the combined values of Hispanic, Black, and Asian CVAP populations at the census block level and still be trustworthy data at the district and other geographic levels.

If we were interested in analyzing a district the size of a single census block or a small number of census blocks, it is possible that errors in the disaggregation process may be worth considering. However, that is not the case here. Each city council district in the illustrative plans consists of *hundreds* of census blocks, not a handful that would amplify the disaggregation error.

In order to demonstrate why the CVAP data totals occasionally have census blocks that are exceeded by the combined values of Hispanic, Black, and Asian CVAP populations, I will explain the Maptitude for Redistricting ("Maptitude") disaggregation process.[9]

The Maptitude software includes a process that disaggregates a population value of a larger geographic area to a lower sub geographic area.[10] This disaggregation is necessary when drawing a redistricting plan in order to assess the CVAP populations within the district. In this particular case, Maptitude was used to disaggregate CVAP data from the block group level to the census block level. Census blocks are the building blocks of districts.

The following is a simple example to calculate CVAP for a census block. If the VAP of a census block group contains 1,000 people and a census block contained within the block group contains 100 people, Maptitude would use 10% or multiply by .1 to determine the CVAP at the block level. Thus, if 500 persons was the CVAP for the block group, 50 would be the estimated CVAP for the census block.

This straightforward example provides the first step in Maptitude's disaggregation process. However, there are many instances when the estimate for the census block equals an integer (a positive whole number) plus a fraction of persons (e,g, 4.5 persons). Because of this occurrence, Maptitude adds a second step. The second step ensures that all blocks contain whole numbers.

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[9] Maptitude is one of the most commonly used software systems by state and local governments, educational institutions, and interest groups for drawing redistricting plans (See Appendix C for partial client list via Caliper website. Source: https://www.caliper.com/mtrnews/clients.htm).

[10] Maptitude has two different disaggregation functions. One for wholly contained matching census geography (which was used in this effort) and the other for non-wholly contained and overlapping geographic areas.

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The second step[11] strips the fractions of persons and assigns them to the largest populated block within the block group. The assignment of these persons eliminates the fractions of persons and increases the population of the largest populated block, but not by a significant amount in most cases.

Figure 6 below shows an actual and typical example of Maptitude's disaggregation process. Figure 6 shows block group 518100422024 in Virginia Beach, VA. It consists of 5 census blocks. The bright red color highlights the largest populated block. The number within each block contains the disaggregated CVAP for each census block.

Source: Maptitude for Redistricting data for Virginia Beach, VA
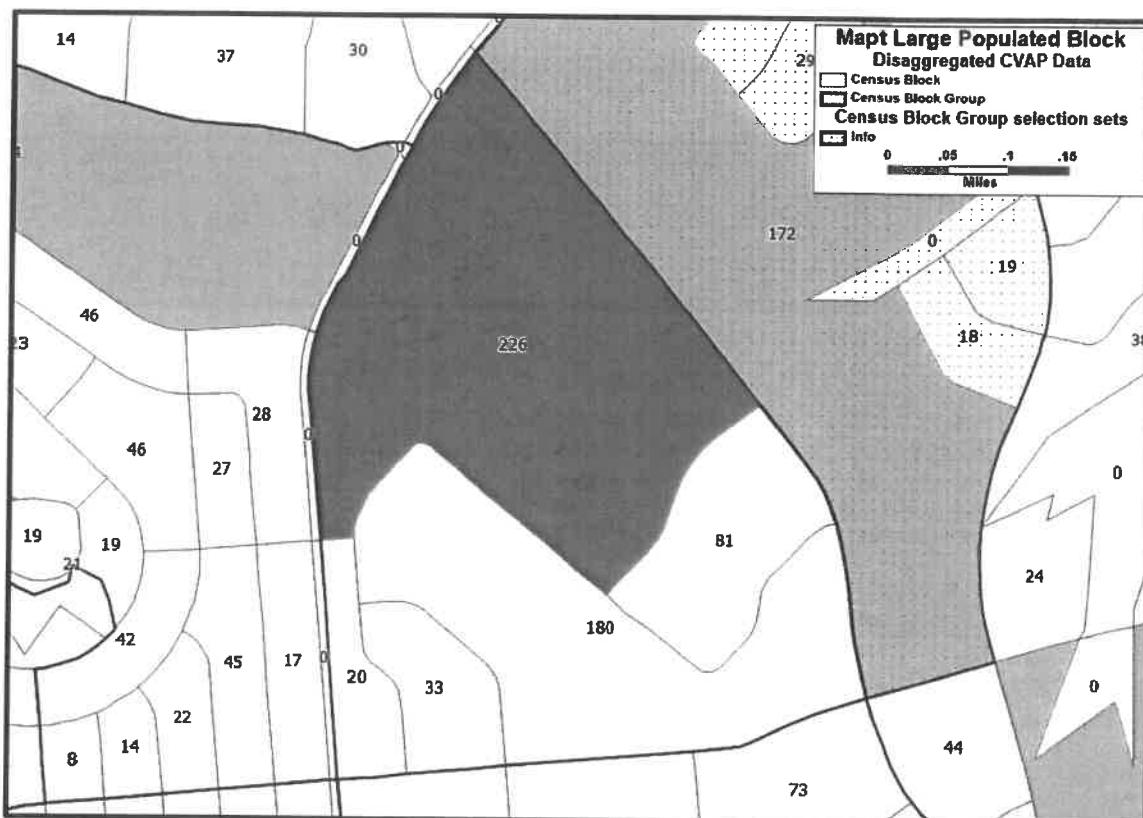
Figure 6 – Block Group 518100422024 Highlighting Largest Populated Block

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[11] Regarding this second step, the Maptitude for Redistricting Documentation states: *Each user attribute field is disaggregated to the Census Block level by distributing the count for each higher-level district to its component blocks or block pieces. The portion assigned to each piece is determined using a weighting field (e.g. Population). These values are truncated to integers, any block count below the minimum threshold is changed to zero, and finally any remainder is then assigned to the largest component block in the district. Where two or more districts intersect a block, each will contribute to the block. The result is an attribute field at the block level containing the disaggregated data.* The documentation uses the term "district" in place of the commonly used geographic area such as block group or VTD.

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The disaggregation process of Maptitude that determines the CVAP for each block is shown in tabular form in Table 3. The first column is the short label of the block ID. Each row represents a different census block with the largest populated block at the bottom. The second column contains the VAP for each census block while the third column contains the VAP for the block group. The fourth column is the weighted amount that will be used to determine the CVAP at the block level. This is calculated by using the block VAP divided by the block group VAP.

The fifth column shows the CVAP for the block group that will be divided up to each census block. The sixth column (Step 1 DisAggr) contains the calculated CVAP for each census block. It is calculated by multiplying the Weighted % by the block/block group CVAP.

The seventh column displays whole CVAP without the fractional amount for each census block. The eighth column provides the fractional change in each census block population due to stripping away or adding to the largest populated block (1.26012 persons). The ninth column shows the stripped away disaggregated CVAP amount for each block except for the largest populated block that includes the added fractional amount totaling the whole number of 226 (224.73988 plus 1.26012 equals 226).

Table 3 – Block Disaggregation Process for Block Group 518100422021								
BlockID	**VAP Block**	**VAP BG**	**Weight %**	**CVAP BG**	**Step 1 DisAgg1**	**Stripped**	**Fraction Change**	**Step 2 DisAgg2**
004	26	692	3.8%	540	20.28902	20	-0.28902	20
003	43	692	6.2%	540	33.55491	33	-0.55491	33
002	104	692	15.0%	540	81.15607	81	-0.15607	81
001	231	692	33.4%	540	180.26012	180	-0.26012	180
000	288	692	41.6%	540	**224.73988**		1.26012	**226**
Sum of fractions of persons that are added to largest Pop block (000)							**1.26012**	

Source: Maptitude for Redistricting census block disaggregated data; U.S. Census Bureau American Community Survey 2013-2017 5-Yr data, 2010 Decennial Population data; Report calculations using Maptitude for Redistricting disaggregation technique.

Measuring the Impact of the Largest Populated Block Disaggregation Technique

The increase in the largest populated block would be worrisome if the city council districts were made up of only a few census blocks. However, the Illustrative Plan's districts are made up of hundreds of census blocks (400 census blocks for District 1 and 633 for District 2 in the initial Illustrative Plan).[12] Thus, aggregating hundreds of census blocks reduces or eliminates any error associated with the assignment of the largest populated block.

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[12] Calculated by counting the district's census blocks that are contained within the district plan block assignment or equivalency file.

In order to truly grasp the minute impact of Maptitude's disaggregation technique, I analyzed the entire district to measure the difference. Instead of performing the disaggregation process that was mentioned in Table 3 for a single block group, I perform this analysis on the entire Illustrative Plan.

To perform the analysis, an Excel spreadsheet was setup with all census blocks and the relevant data fields as shown in Table 3. As before, the same calculation of weight%, the first step of disaggregation, the conversion of all census population to integers, and the calculations of the total amount fraction change amount are included.

The key to analyzing the effect of adding the largest populated census block lies with summing all of the fractional population pieces that are contained within each district. If an area contains a split block group containing the largest populated census block it will be slightly higher and if the district contains only the remaining census blocks (where the stripped fraction population occurred), it will be slightly lower. However, because the vast majority of split block groups that contain the largest populated block also contain the census blocks that had their population fractions stripped off, the two offset each other.

The proof of this offset lies with the final change in population when all of the fractions of persons and the largest populated block are added together in a district. Table 4 demonstrates that District 1's CVAP was lowered by a little over five (5) people for the entire district (-5.09305). The HBA CVAP was lowered a little less than five persons (-4.63910). District 2 had even less of an impact, with 0.11179 persons for the CVAP and 0.85174 for the HBA CVAP. Given the minute differences, the impact is thus trivial.

Further evidence of this practically non-existent change is seen when the HBA CVAP% is calculated using the values without using the largest populated block and comparing it to Maptitude's disaggregation values (using the largest populated block technique). Calculating disaggregation without using the largest populated block technique is achieved by dividing the HBACVAP17 DisAggr column by the CVAP17 DisAggr column for each district.

The HBA CVAP% calculation appears to be exactly the same when they are compared using two (2) decimal places. Both processes, calculated to 50.03% for District 1 and 50.04% for District 2. In order to view any difference, at least three (3) decimal places must be taken in consideration.[13]

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[13] Three of the other districts (Districts 3-10), showed a difference of .01%.

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Table 4 -Illustrative Plan's Population Impact of Largest Populated Block Technique

Dist	CVAP17 DisAggr	CVAP17 Strp	CVAP DISAG	CVAP17 Chg	CVAP17		
01	29766.09305	29641	29761	-5.09305	29761		
02	32803.88821	32642	32804	0.11179	32804		
03	31961.85648	31819	31960	-1.85648	31960		
04	33799.93322	33623	33802	2.06678	33802		
05	34688.84486	34407	34689	0.15514	34689		
06	34443.57816	34140	34447	3.42184	34447		
07	35686.66521	35367	35686	-0.66521	35686		
08	33657.33407	33485	33660	2.66593	33660		
09	32840.24399	32637	32843	2.75601	32843		
10	34851.55528	34651	34848	-3.55528	34848		

Dist	HBA CVAP17 DisAggr	HBAC17 Strp	HBA DISAG	HBAC17 Chg	HBA CVAP17	HBA CVAP17% Mapt	HBA CVAP17% Mapt wo/LPB
01	14892.63910	14770	14888	-4.63910	14888	50.03%	50.03%
02	16414.14826	16235	16415	0.85174	16415	50.04%	50.04%
03	13364.47424	13218	13365	0.52576	13365	41.82%	41.81%
04	10612.27770	10435	10612	-0.27770	10612	31.39%	31.40%
05	7131.76589	6861	7133	1.23411	7133	20.56%	20.56%
06	7428.54973	7128	7430	1.45027	7430	21.57%	21.57%
07	5228.71792	4928	5228	-0.71792	5228	14.65%	14.65%
08	9655.04044	9476	9658	2.95956	9658	28.69%	28.69%
09	8862.08495	8665	8863	0.91505	8863	26.99%	26.99%
10	7561.30030	7364	7559	-2.30030	7559	21.69%	21.70%

Source: Maptitude for Redistricting census block disaggregated data; U.S. Census Bureau American Community Survey 2013-2017 5-Yr data, 2010 Decennial Population data; Illustrative Plan Block Assignment List; Results from Microsoft Excel's consolidation function

Note: wo/LDB calculates districts's HBA CVAP% using disaggregation without the Largest Populated Block technique.

In addition, analysis for all of the Alternative Plans reveal that at most the majority HBA CVAP district plans using Maptitude's largest populated block only deviate .03% or less (see Appendix B).

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Finally, the random distribution of the largest populated block tends to reduce its impact. This is due to the overpopulation occurring in a random manner as a district splits block groups. Figure 7 below reveals the random nature of the distribution of the largest populated block. There is no geographic pattern associated with is location.
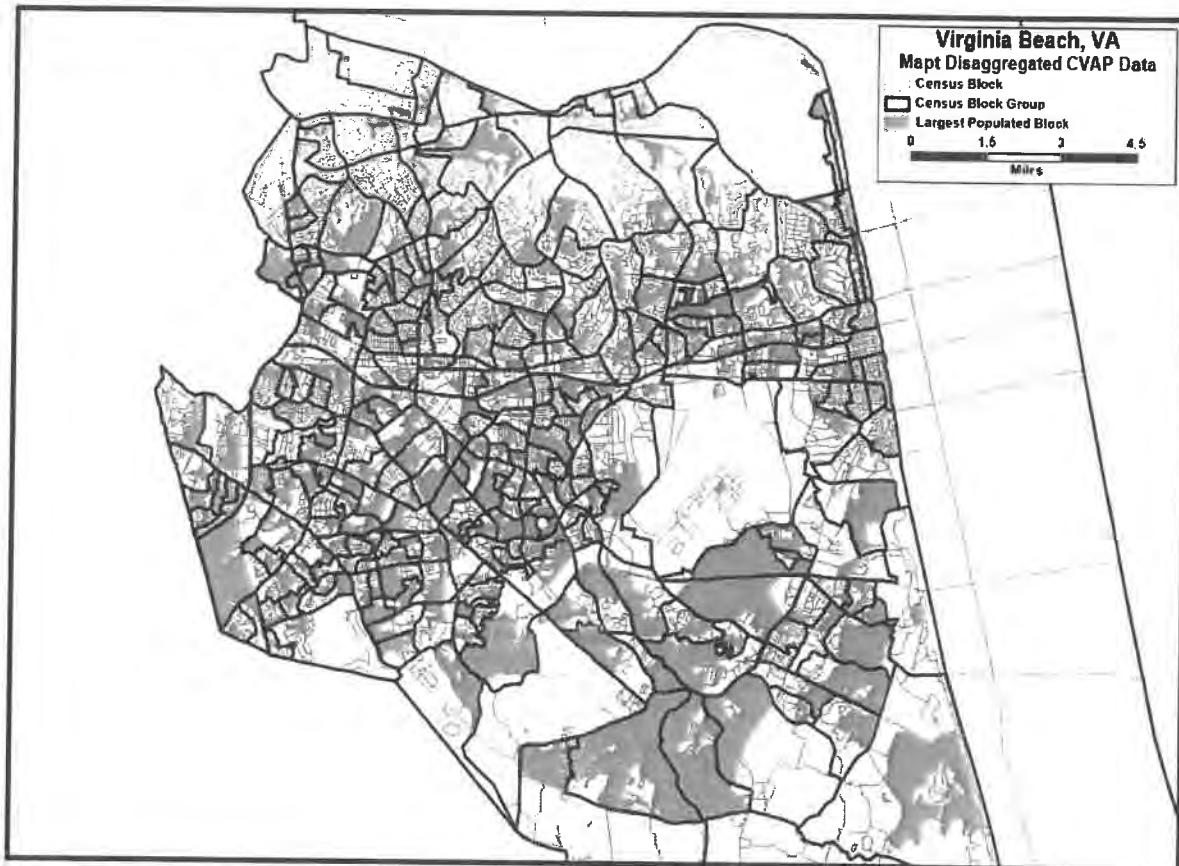
Source: Maptitude for Redistricting Census Block and Block Group Data

Figure 7 – Depiction of the Largest Populated Census Block

Further evidence that the assignment of the largest populated block with the fractional population is not an issue centers on Dr. Morrison's own results. First, Dr. Morrison validates Maptitude's disaggregation process by replicating the process using his own IPF method and returning virtually the same results. His results for the Illustrative Plan were a 49.99% CVAP for District 1 and 49.96% for District 2. My results, using Maptitude's disaggregation process, were 50.03% for District 1 and 50.04% for District 2, respectively. This yields a difference of .04% for District 1 and .08%. for District 2. As stated previously in this report, these amounts are extremely negligible, Dr. Morrison's values round to 50%, and he appears to use a different weighting population (total population) than I do (voting age population).[14]

In addition, Dr. Morrison's results tend to validate the actual amounts that I originally calculated. In essence, two different disaggregation processes were used, and the results were extremely close to each other. This duplicated processing verifies that the disaggregation amounts determined using the Maptitude method are the actual CVAP values for the Illustrative Plan's Districts 1 and 2.

Given all of these factors, I conclude that overall the Maptitude disaggregation process produces reliable disaggregated CVAP values. As I noted above, Maptitude is a widely used application for redistricting and its disaggregation method is a commonly used and reliable technique in the field (see Appendix C).

VI. Response to Dr. Morrison's Claim Regarding an Alleged Assumption of HBA Political Cohesiveness and Communities

Dr. Morrison states that my use of Hispanic, Black, and Asian population data presumes that political cohesiveness exists between Hispanics, Blacks, and Asians. He states that I *"concocted [an] aggregate of three distinct protected minorities (Hispanics, Blacks, and Asians).* He also states that: *"This 'tripart minority coalition' district presumes political cohesion among Hispanics, Blacks, and Asians (an embedded assumption without support).* This argument is nonsensical, for a number of reasons which I outline below.

First, by design, the very purpose of the effort was to focus on whether Hispanic, Black, and Asian CVAP could form a majority in single-member districts. In order to do so, one must consider and aggregate the Hispanic, Black and Asian population data together. It would not make much sense to try to determine whether a majority HBA CVAP district could be drawn by only looking at the black CVAP, for example.

Second, my report provides no opinion on the cohesiveness of minority voters, nor is any proof of the cohesiveness of minority voters necessary to meet the first prong or precondition of *Gingles*.[15] As stated before, the precondition reads:

> "The minority group must be able to demonstrate that it is sufficiently large and geographically compact to constitute a majority in a single-member district."

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[14] The data provided by Dr. Morrison did not contain label descriptions, but appear to reflect the use of total population and not voting age population.
[15] Thornburg v. Gingles, 478 U.S. 30 (1986)

It is my understanding that the political cohesiveness of the HBA population will be addressed by other experts retained by Plaintiffs.

It is also worth stating that Dr. Morrison does not address at all the analysis shown in my initial report that further shows that Hispanics, Blacks, and Asians share common communities and form communities of interest in Virginia Beach. Dr. Morrison's claims seem to suggest that Hispanics, Black, and Asians do not exist in common communities to form a majority minority district. Again, my unrebutted analysis in my initial report shows that is not the case.

Reviewing census tracts from 1990 to recent years shows a growing community of Hispanic, Black and Asians. In 1990, there was only one majority HBA (Total Population) census tract in the city of Virginia Beach.[16] However, according to the 2013 – 2017 5-Year ACS data (2015MP), 10 census tracts now have a combined HBA majority. These 2013-2017 majority HBA communities[17] are located near the western center of Virginia Beach and toward the west and north-west Norfolk & Chesapeake boundary areas of the city (see Figure 8).

A review of the location of these majority HBA census tracts reveals that they are growing only in certain locations of the city. Simply put, HBA persons have chosen to reside in the same areas of the city.

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[16] 1990 Decennial Census Survey census tract level
[17] A census tract usually contains one or more neighborhoods within its boundary.

18
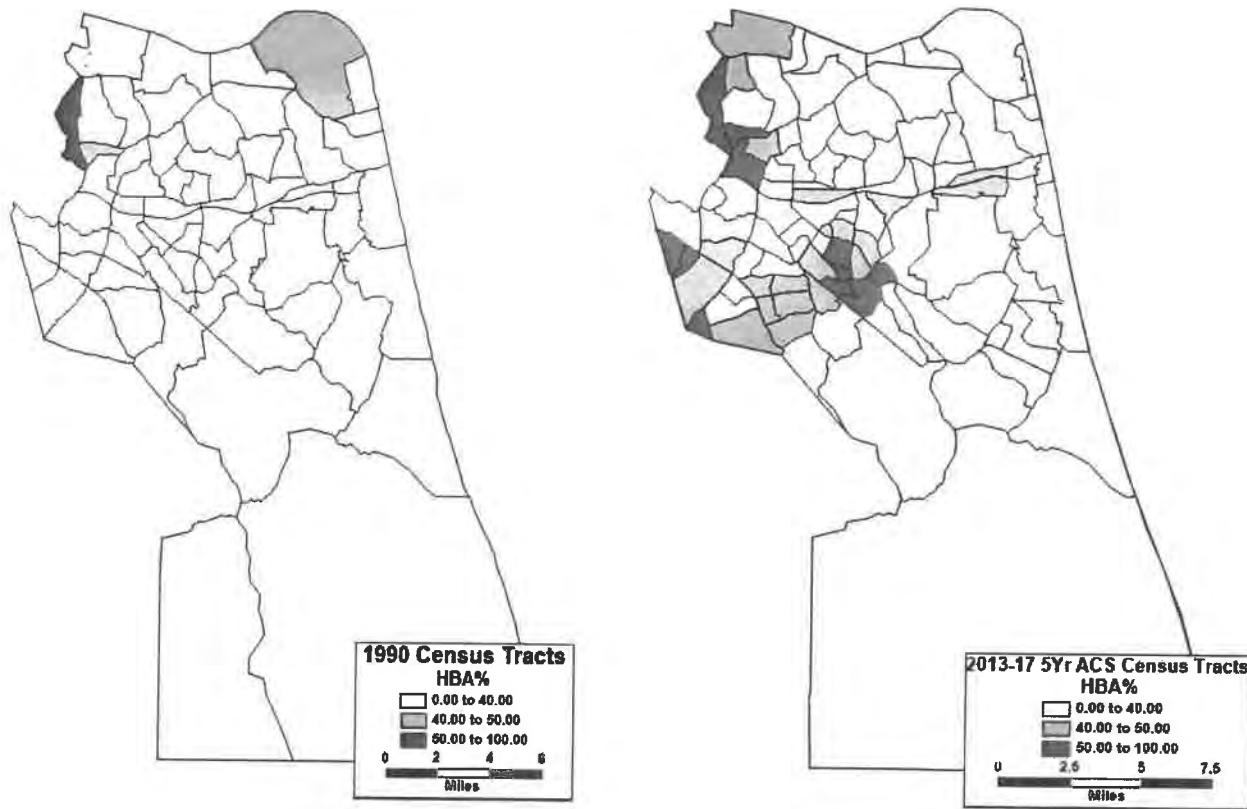
Figure 8 – Virginia Beach, VA Maj. HBA (Total Race) Census Tracts
(1990 Decennial Census & 2013-2017 5Yr ACS)

Note: Race categories are Alone (Single Race) Not Hispanic categories
Source: U.S. Census Bureau PL94-171 data for 1990; 2013 - 2017 5-Year ACS data

Additional evidence is shown by reviewing the dot density maps. This provides a different perspective yet yields similar conclusions.

Figures 9, 10, and 11 depict the distribution of Hispanic, Black, and Asian populations throughout the city. Each red dot on the map represents 500 persons residing within the census tract for each respective race/ethnicity. Collectively, the red dots of Hispanic, Black, or Asian population are centered mostly around census tracts that are greater than 40% or 50% HBA.

In fact, reviewing data that sums each race/ethnicity in the census tracts that have greater than 40% HBA verifies that most Hispanic, Black, and Asian persons reside in the same communities. Table 5 shows that 31 of Virginia Beach's 100 census tracts contain 54.90% of the HBA combined population. The same census tracts contain 45.50% of the Hispanic population, 59.02% of the Black population, and 52.20% of the Asian population.

19
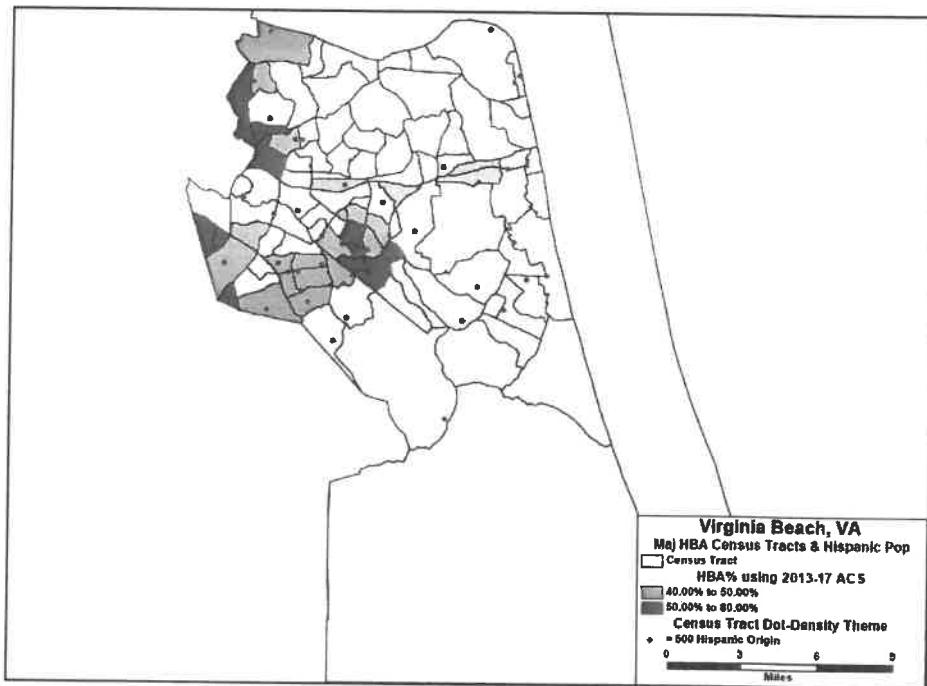
Figure 9 – Virginia Beach, VA Maj. HBA (Total Race) Census Tracts
(with Hispanic Dot Density Points using 2013-2017 5Yr ACS)

20
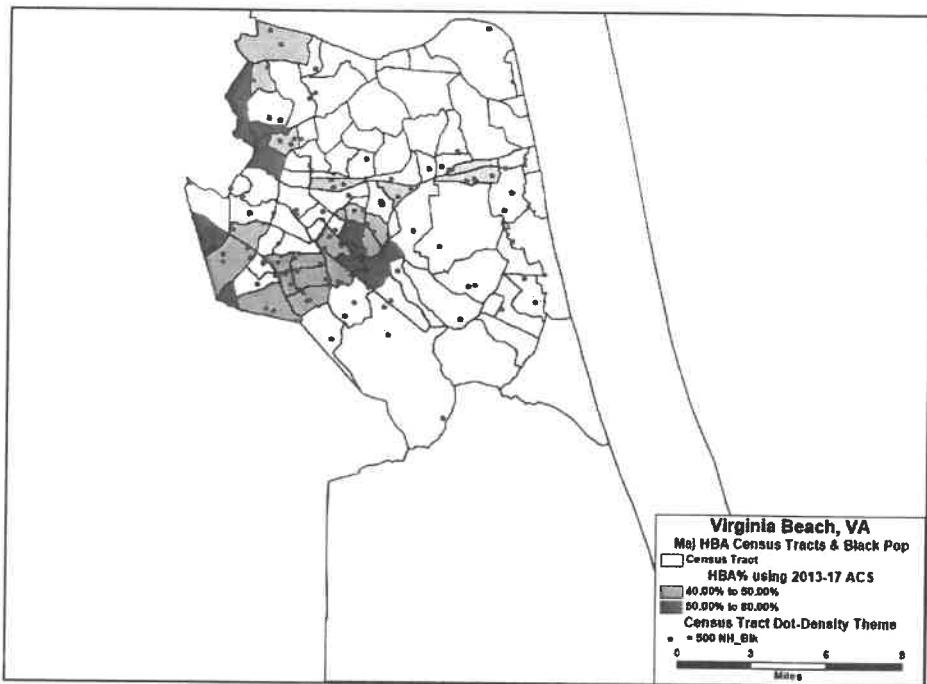
Figure 10 – Virginia Beach, VA Maj. HBA (Total Race) Census Tracts
(with Black Dot Density Points using 2013-2017 5Yr ACS)
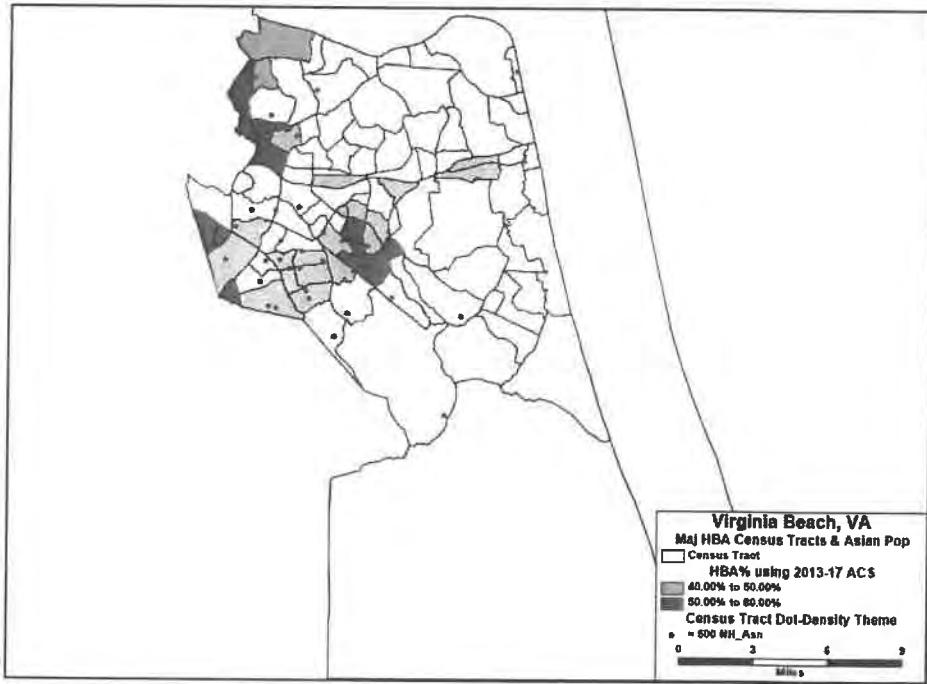
Figure 11 – Virginia Beach, VA Maj. HBA (Total Race) Census Tracts
(with Asian Dot Density Points using 2013-2017 5Yr ACS)

Table 4 – VAB Population of HBA Residing in >40% and >50% HBA Census Tracts

HBA% CT	# CTs	Hispanic	Black	Asian	HBATTL
>40%	31	13188	49113	13735	76036
>50%	10	4629	22381	4102	31112
City Total	100	28987	83210	26312	138509
HBA% CT	**# CTs**	**Hispanic%**	**Black%**	**Asian%**	**HBATTL%**
>40%	31	45.50%	59.02%	52.20%	54.90%
>50%	10	15.97%	26.90%	15.59%	22.46%
City Total	100	100.00%	100.00%	100.00%	100.00%

Note: HBATTL – Total Hispanic, Black, and Asian combined persons (Not Hispanic Black and Asian categories); and CT - Census Tract

Source: U.S. Census Bureau 2013-2017 5-Year ACS data using Maptitude for Redistricting Dataview Statistical Summary option

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Finally, not only do the maps show that the Hispanic, Black, and Asian populations tend to reside in HBA census tracts, close inspection of the maps reveals a similar pattern outside of the majority HBA census tracts. Thus, even where a census tract is not majority HBA, the HBA population tends to reside in those areas.

VII. Conclusions

After addressing all of Dr. Morrison's concerns, I stand by my original conclusion that the minority population in the city of Virginia Beach, VA is sufficiently large and geographically compact to enable the creation of two single-member majority Hispanic, Black and Asian combined districts.

I, Anthony E. Fairfax, am over the age of 18 and fully competent to make this declaration. I declare under penalty of perjury under the laws of the United States that the foregoing is true and correct to the best of my knowledge.
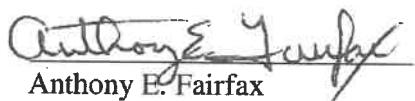
Anthony E. Fairfax
August 26, 2019

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Appendix A

Alternative Plans

Alternative Plans 1 through 5

Virginia Beach, VA
Illustrative Plan Alt 1 Districts 1 & 2

County
Water Area
Voting District
Streets
Districts

0   1   2   3
Miles
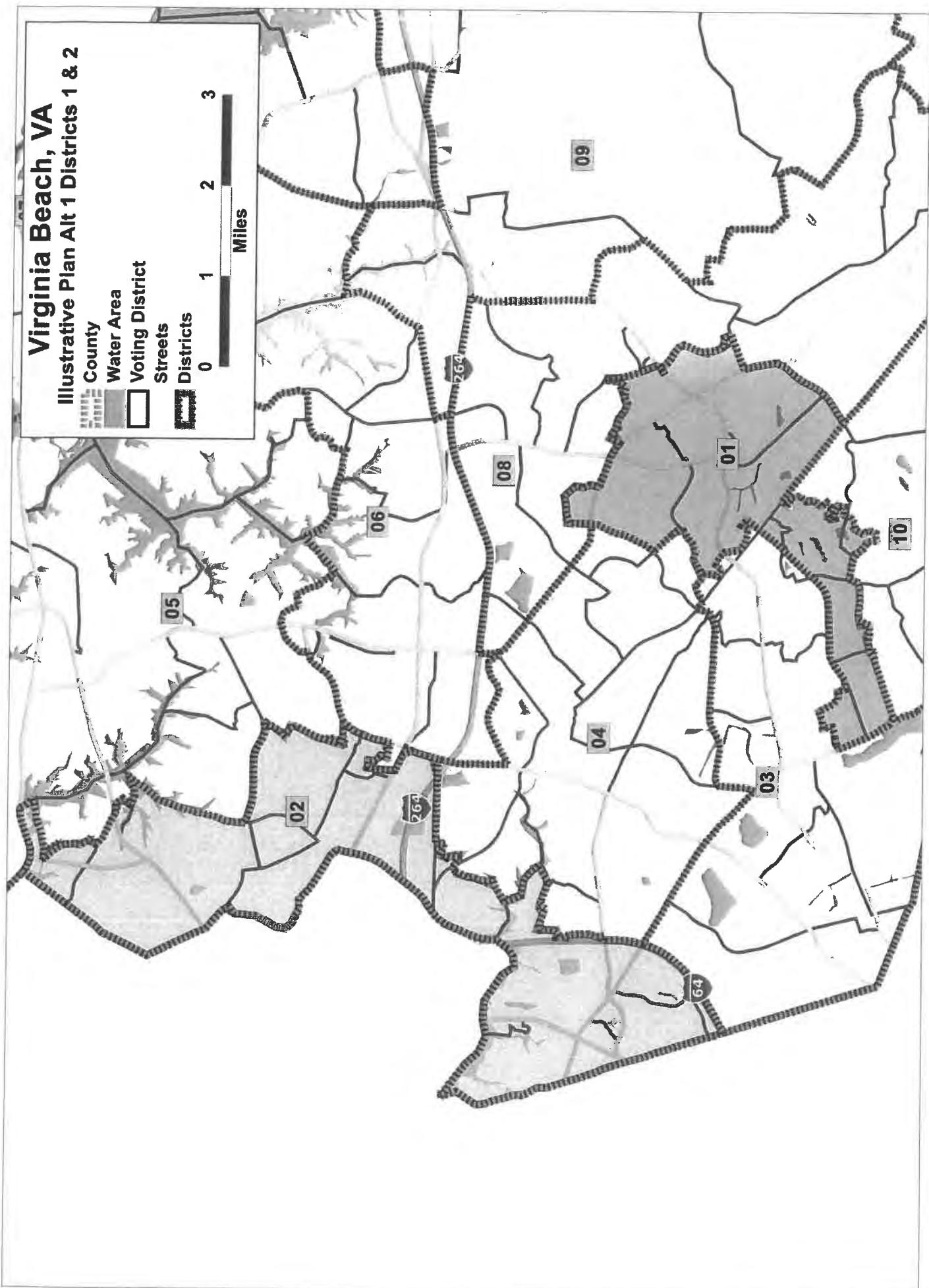
Virginia Beach, VA
Illustrative Alternative 1 Plan - 10 Districts Statistics

District	Population	Deviation	% Deviation	ispanic Orig	Hispanic Orig	NH_Wht	% NH_Wht	NH_Blk	% NH_Blk	NH_Asn	% NH_Asn	HBATTL	HBATTL%
01	41708	-2091	-4.77%	4047	9.70%	17702	42.44%	12966	31.09%	4924	11.81%	21937	52.60%
02	41977	-1822	-4.16%	3060	7.29%	17939	42.74%	17449	41.57%	1872	4.46%	22381	53.32%
03	43433	-366	-0.84%	2926	6.74%	22810	52.52%	10160	23.39%	5571	12.83%	18657	42.96%
04	45650	1851	4.23%	2559	5.61%	29816	65.31%	8118	17.78%	3343	7.32%	14020	30.71%
05	42745	-1054	-2.41%	2239	5.24%	33115	77.47%	4162	9.74%	1836	4.30%	8237	19.27%
06	43282	-517	-1.18%	2584	5.97%	32170	74.33%	5457	12.61%	1592	3.68%	9633	22.26%
07	44872	1073	2.45%	2499	5.57%	36743	81.88%	3429	7.64%	922	2.05%	6850	15.27%
08	44996	1197	2.73%	3475	7.72%	28877	64.18%	8206	18.24%	2403	5.34%	14084	31.30%
09	44507	708	1.62%	3472	7.80%	30186	67.82%	7645	17.18%	1281	2.88%	12398	27.86%
10	44824	1025	2.34%	2126	4.74%	33112	73.87%	5618	12.53%	2568	5.73%	10312	23.01%

District	18+_Pop	Deviation	% Deviation	H18+_Pop	% H18+_Pop	NH18+_Wht	% NH18+_Wht	NH18+_Blk	% NH18+_Blk	NH18+_Asn	% NH18+_Asn	HBAVAP	HBAVAP%
01	30303	-2091	-4.77%	2602	8.59%	13837	45.66%	9039	29.83%	3834	12.65%	15475	51.07%
02	31775	-1822	-4.16%	2021	6.36%	14958	47.07%	12364	38.91%	1529	4.81%	15914	50.08%
03	32241	-366	-0.84%	1799	5.58%	17630	54.68%	7375	22.87%	4549	14.11%	13723	42.56%
04	34845	1851	4.23%	1657	4.76%	23741	68.13%	5847	16.78%	2690	7.72%	10194	29.26%
05	33983	-1054	-2.41%	1511	4.45%	27109	79.77%	3171	9.33%	1449	4.26%	6131	18.04%
06	33263	-517	-1.18%	1744	5.24%	25442	76.49%	4034	12.13%	1264	3.80%	7042	21.17%
07	36351	1073	2.45%	1699	4.67%	30571	84.10%	2562	7.05%	763	2.10%	5024	13.82%
08	33115	1197	2.73%	2166	6.54%	22018	66.49%	5967	18.02%	1944	5.87%	10077	30.43%
09	33642	708	1.62%	2229	6.63%	24028	71.42%	5394	16.03%	1034	3.07%	8657	25.73%
10	33227	1025	2.34%	1337	4.02%	24854	74.80%	4459	13.42%	1922	5.78%	7718	23.23%

District	Total17	Deviation	% Deviation	Hisp17	% Hisp17	White17	% White17	Black17	% Black17	Asian17	% Asian17	HBA17	HBA17%
01	40143	-2091	-4.77%	3891	9.69%	15747	39.23%	12446	31.00%	5364	13.36%	21701	54.06%
02	44354	-1822	-4.16%	4565	10.29%	17832	40.20%	17854	40.25%	2612	5.89%	25031	56.43%
03	44106	-366	-0.84%	4520	10.25%	22350	50.67%	9160	20.77%	5386	12.21%	19066	43.23%
04	46533	1851	4.23%	3182	6.84%	29096	62.53%	8067	17.34%	4037	8.68%	15286	32.85%
05	44673	-1054	-2.41%	3022	6.76%	33725	75.49%	4432	9.92%	1589	3.56%	9043	20.24%
06	44600	-517	-1.18%	3180	7.13%	31184	69.92%	5498	12.33%	2170	4.87%	10848	24.32%
07	45643	1073	2.45%	2098	4.60%	36139	79.18%	4409	9.66%	1224	2.68%	7731	16.94%
08	47151	1197	2.73%	4440	9.42%	30472	64.63%	7445	15.79%	2703	5.73%	14588	30.94%
09	45704	708	1.62%	4135	9.05%	29869	65.35%	7891	17.27%	1488	3.26%	13514	29.57%
10	47150	1025	2.34%	2222	4.71%	34656	73.50%	5785	12.27%	2482	5.26%	10489	22.25%

District	CVAP17	Deviation	% Deviation	HCVAP17	% HCVAP17	WCVAP17	% WCVAP17	BCVAP17	% BCVAP17	ACVAP17	% ACVAP17	HBACVAP17	% HBACVAP17	HBAWCVP17	% HBAWCVP17
01	28300	-2091	-4.77%	2119	7.49%	12609	44.55%	9056	32.00%	3407	12.04%	14575	51.50%	14898	52.64%
02	32634	-1822	-4.16%	2346	7.19%	15004	45.98%	13141	40.27%	1387	4.25%	16851	51.64%	17171	52.62%
03	31770	-366	-0.84%	2629	8.28%	17380	54.71%	7171	22.57%	3380	10.64%	13179	41.48%	13368	42.08%
04	34584	1851	4.23%	1811	5.24%	22925	66.29%	6175	17.86%	2689	7.78%	10696	30.93%	10814	31.27%
05	34580	-1054	-2.41%	1808	5.23%	27115	78.41%	3540	10.24%	1142	3.30%	6511	18.83%	6623	19.15%
06	33756	-517	-1.18%	1873	5.55%	24990	74.03%	4184	12.39%	1418	4.20%	7460	22.10%	7590	22.48%
07	35686	1073	2.45%	1150	3.22%	29635	83.04%	3279	9.19%	799	2.24%	5228	14.65%	5398	15.13%
08	34775	1197	2.73%	2545	7.32%	23660	68.04%	5408	15.55%	1822	5.24%	9765	28.08%	10185	29.29%
09	33676	708	1.62%	2464	7.32%	23435	69.59%	5628	16.71%	922	2.74%	8998	26.72%	9354	27.78%
10	34739	1025	2.34%	1478	4.25%	25852	74.42%	4546	13.09%	1834	5.28%	7888	22.71%	8092	23.29%

Note: Variables with 17 suffix denote 2013-2017 5-Year ACS; HBAWCVP17 includes Hispanic, Black, and Asian CVAP plus Black and White CVAP mixed persons

Source: Maptitude for Redistricting District Statistics window using U.S. Census Bureau 2010 Census Data and 2013-2017 5-Year ACS Data

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User:
Plan Name: **VAB Illustrative Plan Final 10 Alt v1**
Plan Type:

Contiguity Report

Sunday, August 18, 2019   7:03 PM

District	Number of Distinct Areas
01	1
02	1
03	1
04	1
05	1
06	1
07	1
08	1
09	1
10	1

User:
Plan Name: **VAB Illustrative Plan Final 10 Alt v1**
Plan Type:

Measures of Compactness Report

Sunday, August 18, 2019   4:34 PM

	Reock	Perimeter	Polsby-Popper	MinConvexPoly
Sum	N/A	0.00	N/A	N/A
Min	0.20	N/A	0.16	0.54
Max	0.57	N/A	0.56	0.88
Mean	0.38	N/A	0.36	0.75
Std. Dev.	0.12	N/A	0.13	0.13

District	Reock	Perimeter	Polsby-Popper	MinConvexPoly
01	0.31		0.20	0.58
02	0.20		0.16	0.54
03	0.41		0.38	0.76
04	0.57		0.46	0.86
05	0.37		0.40	0.86
06	0.28		0.29	0.70
07	0.53		0.56	0.86
08	0.26		0.23	0.62
09	0.41		0.40	0.81
10	0.50		0.50	0.88

Maptitude
For Redistricting

29

User:

Plan Name: **VAB Illustrative Plan Final 10 Alt v1**

Plan Type:

Political Subdivison Splits Between Districts

Monday, August 26, 2019   1:36 AM

Total number of subdivisions:

County	0
Voting District	72

Number of subdivisions split into more than one district:

County	1
Voting District	22

Number of splits involving no population:

County	0
Voting District	0

Split Counts

County

   Cases where an area is split among 10 Districts: 1

Voting District

   Cases where an area is split among 2 Districts: 20

   Cases where an area is split among 3 Districts: 2

County	Voting District	District	Population
Split Counties:			
Virginia Beach City VA		01	41,708
Virginia Beach City VA		02	41,977
Virginia Beach City VA		03	43,433
Virginia Beach City VA		04	45,650
Virginia Beach City VA		05	42,745
Virginia Beach City VA		06	43,282
Virginia Beach City VA		07	44,872
Virginia Beach City VA		08	44,996
Virginia Beach City VA		09	44,507
Virginia Beach City VA		10	44,824
Split VTDs:			
Virginia Beach City VA	Aragona	02	1,141
Virginia Beach City VA	Aragona	06	6,139
Virginia Beach City VA	Arrowhead	02	2,833
Virginia Beach City VA	Arrowhead	04	1,883
Virginia Beach City VA	Avalon	02	3,729
Virginia Beach City VA	Avalon	04	858
Virginia Beach City VA	Bayside	02	804
Virginia Beach City VA	Bayside	05	1,557
Virginia Beach City VA	Bonney	02	688
Virginia Beach City VA	Bonney	06	2,754
Virginia Beach City VA	Buckner	01	4,515
Virginia Beach City VA	Buckner	03	230

Political Subdivison Splits Between Districts

VAB Illustrative Plan Final 10

County	Voting District	District	Population
Virginia Beach City VA	Cromwell	01	660
Virginia Beach City VA	Cromwell	10	2,561
Virginia Beach City VA	Dahlia	01	6,293
Virginia Beach City VA	Dahlia	04	1,417
Virginia Beach City VA	Glenwood	01	1,203
Virginia Beach City VA	Glenwood	10	3,132
Virginia Beach City VA	Holland	01	4,741
Virginia Beach City VA	Holland	08	3,079
Virginia Beach City VA	Hunt	08	2,022
Virginia Beach City VA	Hunt	10	1,703
Virginia Beach City VA	Kingston	05	1,694
Virginia Beach City VA	Kingston	06	812
Virginia Beach City VA	Magic Hollow	01	3,396
Virginia Beach City VA	Magic Hollow	08	3,913
Virginia Beach City VA	Point O' View	02	180
Virginia Beach City VA	Point O' View	04	3,164
Virginia Beach City VA	Rock Lake	01	4,811
Virginia Beach City VA	Rock Lake	03	315
Virginia Beach City VA	Rock Lake	10	542
Virginia Beach City VA	Rosemont Forest	01	1,770
Virginia Beach City VA	Rosemont Forest	03	3,953
Virginia Beach City VA	Round Hill	01	1,318
Virginia Beach City VA	Round Hill	03	5,890
Virginia Beach City VA	Shannon	04	2,877
Virginia Beach City VA	Shannon	08	451
Virginia Beach City VA	Shelton Park	02	2,322
Virginia Beach City VA	Shelton Park	05	1,672
Virginia Beach City VA	Timberlake	01	4,022
Virginia Beach City VA	Timberlake	03	563
Virginia Beach City VA	Timberlake	04	1,949
Virginia Beach City VA	Upton	09	1,141
Virginia Beach City VA	Upton	10	3,955
Virginia Beach City VA	Windsor Oaks	01	1,197
Virginia Beach City VA	Windsor Oaks	08	5,310

Virginia Beach, VA
Illustr Plan Alt 1 Dist 1&2 Subdiv Zoom

Subdivision
Voting District
Districts

Miles

0   1   2   3

32

Virginia Beach, VA
Illustrative Plan Alt 2 Districts 1 & 2
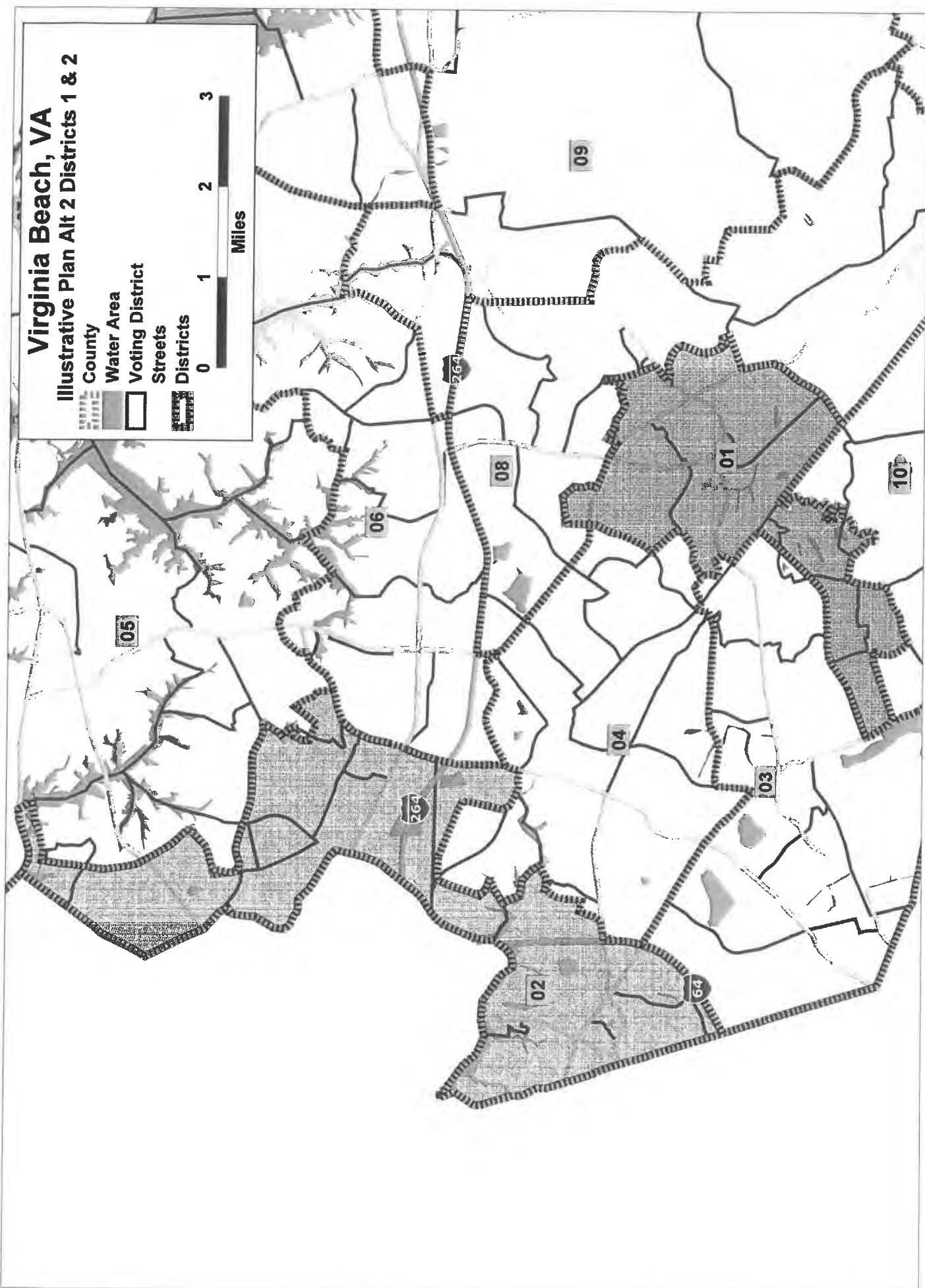
Virginia Beach, VA
Illustrative Alternative 2 Plan - 10 Districts Statistics

District	Population	Deviation	% Deviation	Hispanic Orig	ispanic Orig	NH_Wht	% NH_Wht	NH_Blk	% NH_Blk	NH_Asn	% NH_Asn	HBATTL	HBATTL%
01	41681	-2118	-4.84%	4024	9.65%	17709	42.49%	12968	31.11%	4921	11.81%	21913	52.57%
02	41875	-1924	-4.39%	3013	7.20%	17868	42.67%	17612	42.06%	1725	4.12%	22350	53.37%
03	44521	722	1.65%	3007	6.75%	23324	52.39%	10429	23.42%	5742	12.90%	19178	43.08%
04	44576	777	1.77%	2542	5.70%	28833	64.68%	8091	18.15%	3318	7.44%	13951	31.30%
05	44624	825	1.88%	2370	5.31%	34307	76.88%	4473	10.02%	2025	4.54%	8868	19.87%
06	42579	-1220	-2.79%	2517	5.91%	32032	75.23%	5010	11.77%	1575	3.70%	9102	21.38%
07	44872	1073	2.45%	2499	5.57%	36743	81.88%	3429	7.64%	922	2.05%	6850	15.27%
08	44996	1197	2.73%	3475	7.72%	28877	64.18%	8206	18.24%	2403	5.34%	14084	31.30%
09	44507	708	1.62%	3472	7.80%	30186	67.82%	7645	17.18%	1281	2.88%	12398	27.86%
10	43763	-36	-0.08%	2068	4.73%	32591	74.47%	5347	12.22%	2400	5.48%	9815	22.43%

District	18+_Pop	Deviation	% Deviation	H18+_Pop	% H18+_Pop	NH18+_Wht	% NH18+_Wht	NH18+_Blk	% NH18+_Blk	NH18+_Asn	% NH18+_Asn	HBAVAP	HBAVAP%
01	30278	-2118	-4.84%	2581	8.52%	13847	45.73%	9021	29.79%	3847	12.71%	15449	51.02%
02	31584	-1924	-4.39%	1981	6.27%	14864	47.06%	12444	39.40%	1408	4.46%	15833	50.13%
03	33023	722	1.65%	1851	5.61%	18004	54.52%	7590	22.98%	4668	14.14%	14109	42.72%
04	33982	777	1.77%	1646	4.84%	22935	67.49%	5832	17.16%	2668	7.85%	10146	29.86%
05	35490	825	1.88%	1600	4.51%	28119	79.23%	3385	9.54%	1607	4.53%	6592	18.57%
06	32810	-1220	-2.79%	1706	5.20%	25332	77.21%	3755	11.44%	1249	3.81%	6710	20.45%
07	36351	1073	2.45%	1699	4.67%	30571	84.10%	2562	7.05%	763	2.10%	5024	13.82%
08	33115	1197	2.73%	2166	6.54%	22018	66.49%	5967	18.02%	1944	5.87%	10077	30.43%
09	33642	708	1.62%	2229	6.63%	24028	71.42%	5394	16.03%	1034	3.07%	8657	25.73%
10	32470	-36	-0.08%	1306	4.02%	24470	75.36%	4262	13.13%	1790	5.51%	7358	22.66%

District	Total17	Deviation	% Deviation	Hisp17	% Hisp17	White17	% White17	Black17	% Black17	Asian17	% Asian17	HBA17	HBA17%
01	40060	-2118	-4.84%	3891	9.71%	15972	39.87%	12318	30.75%	5301	13.23%	21510	53.69%
02	44343	-1924	-4.39%	4424	9.98%	18104	40.83%	17848	40.25%	2391	5.39%	24663	55.62%
03	45360	722	1.65%	4596	10.13%	22807	50.28%	9522	20.99%	5581	12.30%	19699	43.43%
04	45462	777	1.77%	3158	6.95%	28234	62.10%	8035	17.67%	3876	8.53%	15069	33.15%
05	46679	825	1.88%	3232	6.92%	34906	74.78%	4622	9.90%	1971	4.22%	9825	21.05%
06	43676	-1220	-2.79%	3135	7.18%	30593	70.05%	5346	12.24%	2170	4.97%	10551	24.39%
07	45643	1073	2.45%	2098	4.60%	36139	79.18%	4409	9.66%	1224	2.68%	7731	16.94%
08	47151	1197	2.73%	4440	9.42%	30472	64.63%	7445	15.79%	2703	5.73%	14588	30.94%
09	45704	708	1.62%	4135	9.05%	29869	65.35%	7891	17.27%	1488	3.26%	13514	29.57%
10	45979	-36	-0.08%	2146	4.67%	33974	73.89%	5551	12.07%	2350	5.11%	10047	21.85%

District	CVAP17	Deviation	% Deviation	HCVAP17	% HCVAP17	WCVAP17	% WCVAP17	BCVAP17	% BCVAP17	ACVAP17	% ACVAP17	HBACVAP17	% HBACVAP17	HBAWCVP17	% HBAWCVP17
01	28225	-2118	-4.84%	2135	7.56%	12750	45.17%	8865	31.41%	3405	12.06%	14405	51.04%	14719	52.15%
02	32395	-1924	-4.39%	2265	6.99%	15025	46.38%	13080	40.38%	1200	3.70%	16545	51.07%	16885	52.12%
03	32616	722	1.65%	2642	8.10%	17751	54.42%	7494	22.98%	3463	10.62%	13595	41.68%	13799	42.31%
04	33849	777	1.77%	1777	5.25%	22287	65.84%	6150	18.17%	2679	7.91%	10611	31.35%	10729	31.70%
05	36137	825	1.88%	1929	5.34%	28144	77.88%	3732	10.33%	1339	3.71%	7016	19.42%	7130	19.73%
06	33173	-1220	-2.79%	1867	5.63%	24578	74.09%	4078	12.29%	1418	4.27%	7346	22.14%	7454	22.47%
07	35686	1073	2.45%	1150	3.22%	29635	83.04%	3279	9.19%	799	2.24%	5228	14.65%	5398	15.13%
08	34775	1197	2.73%	2545	7.32%	23660	68.04%	5408	15.55%	1822	5.24%	9765	28.08%	10185	29.29%
09	33676	708	1.62%	2464	7.32%	23435	69.59%	5628	16.71%	922	2.74%	8998	26.72%	9354	27.78%
10	33968	-36	-0.08%	1449	4.27%	25340	74.60%	4414	12.99%	1753	5.16%	7642	22.50%	7840	23.08%

Note: Variables with 17 suffix denote 2013-2017 5-Year ACS; HBAWCVP17 includes Hispanic, Black, and Asian CVAP plus Black and White CVAP mixed persons

Source: Maptitude for Redistricting District Statistics window using U.S. Census Bureau 2010 Census Data and 2013-2017 5-Year ACS Data

User:
Plan Name: **VAB Illustrative Plan Final 10 Alt v2**
Plan Type:

Contiguity Report

Sunday, August 18, 2019   7:00 PM

District	Number of Distinct Areas
01	1
02	1
03	1
04	1
05	1
06	1
07	1
08	1
09	1
10	1

User:

Plan Name: **VAB Illustrative Plan Final 10 Alt v2**

Plan Type:

Measures of Compactness Report

Sunday, August 18, 2019

5:09 PM

Sum	N/A	0.00	N/A
Min	0.20	N/A	0.49
Max	0.53	N/A	0.87
Mean	0.38	N/A	0.75
Std. Dev.	0.11	N/A	0.13

District	Reock	Perimeter	Polsby-Popper	MinConvexPoly
01	0.32		0.21	0.61
02	0.20		0.15	0.49
03	0.43		0.43	0.77
04	0.51		0.46	0.84
05	0.39		0.41	0.86
06	0.28		0.31	0.72
07	0.53		0.56	0.86
08	0.26		0.23	0.62
09	0.41		0.40	0.81
10	0.50		0.50	0.87

Maptitude
for Redistricting

36

User:
Plan Name: **VAB Illustrative Plan Final 10 Alt v2**
Plan Type:

Political Subdivison Splits Between Districts

Sunday, August 18, 2019   6:52 PM

Total number of subdivisions:

County	0
Voting District	69

Number of subdivisions split into more than one district:

County	1
Voting District	25

Number of splits involving no population:

County	0
Voting District	2

Split Counts

County
    Cases where an area is split among 10 Districts: 1
Voting District
    Cases where an area is split among 2 Districts: 23
    Cases where an area is split among 3 Districts: 2

County	Voting District	District	Population
Split Counties:			
Virginia Beach City VA		01	41,681
Virginia Beach City VA		02	41,875
Virginia Beach City VA		03	44,521
Virginia Beach City VA		04	44,576
Virginia Beach City VA		05	44,624
Virginia Beach City VA		06	42,579
Virginia Beach City VA		07	44,872
Virginia Beach City VA		08	44,996
Virginia Beach City VA		09	44,507
Virginia Beach City VA		10	43,763
Split VTDs:			
Virginia Beach City VA	Aragona	02	1,844
Virginia Beach City VA	Aragona	06	5,436
Virginia Beach City VA	Arrowhead	02	2,324
Virginia Beach City VA	Arrowhead	04	2,392
Virginia Beach City VA	Avalon	02	4,441
Virginia Beach City VA	Avalon	04	146
Virginia Beach City VA	Bayside	02	595
Virginia Beach City VA	Bayside	05	1,766
Virginia Beach City VA	Bonney	02	688
Virginia Beach City VA	Bonney	06	2,754
Virginia Beach City VA	Cromwell	01	660
Virginia Beach City VA	Cromwell	10	2,561

Maptitude
For Redistricting

Page 1 of 2

Political Subdivison Splits Between Districts

VAB Illustrative Plan Final 10

County	Voting District	District	Population
Virginia Beach City VA	Dahlia	01	6,293
Virginia Beach City VA	Dahlia	04	1,417
Virginia Beach City VA	Davis Corner	02	5,998
Virginia Beach City VA	Davis Corner	05	130
Virginia Beach City VA	Fairfield	02	0
Virginia Beach City VA	Fairfield	04	3,299
Virginia Beach City VA	Glenwood	01	2,264
Virginia Beach City VA	Glenwood	10	2,071
Virginia Beach City VA	Holland	01	4,741
Virginia Beach City VA	Holland	08	3,079
Virginia Beach City VA	Hunt	08	2,022
Virginia Beach City VA	Hunt	10	1,703
Virginia Beach City VA	Kingston	05	1,694
Virginia Beach City VA	Kingston	06	812
Virginia Beach City VA	Magic Hollow	01	3,396
Virginia Beach City VA	Magic Hollow	08	3,913
Virginia Beach City VA	Old Donation	02	576
Virginia Beach City VA	Old Donation	05	5,040
Virginia Beach City VA	Point O' View	02	1,051
Virginia Beach City VA	Point O' View	04	2,293
Virginia Beach City VA	Providence	03	0
Virginia Beach City VA	Providence	04	3,920
Virginia Beach City VA	Rock Lake	01	4,811
Virginia Beach City VA	Rock Lake	03	315
Virginia Beach City VA	Rock Lake	10	542
Virginia Beach City VA	Rosemont Forest	01	1,770
Virginia Beach City VA	Rosemont Forest	03	3,953
Virginia Beach City VA	Shannon	04	2,877
Virginia Beach City VA	Shannon	08	451
Virginia Beach City VA	Shell	02	3,256
Virginia Beach City VA	Shell	05	1,260
Virginia Beach City VA	Shelton Park	02	1,466
Virginia Beach City VA	Shelton Park	05	2,528
Virginia Beach City VA	Timberlake	01	4,022
Virginia Beach City VA	Timberlake	03	563
Virginia Beach City VA	Timberlake	04	1,949
Virginia Beach City VA	Upton	09	1,141
Virginia Beach City VA	Upton	10	3,955
Virginia Beach City VA	Windsor Oaks	01	1,197
Virginia Beach City VA	Windsor Oaks	08	5,310

Virginia Beach, VA
Illustr Plan Alt 2 Dist 1&2 Subdiv Zoom

Subdivision
Voting District
Districts

Miles
0   1   2   3

39

Virginia Beach, VA
Illustrative Plan Alt 3 Districts 1 & 2
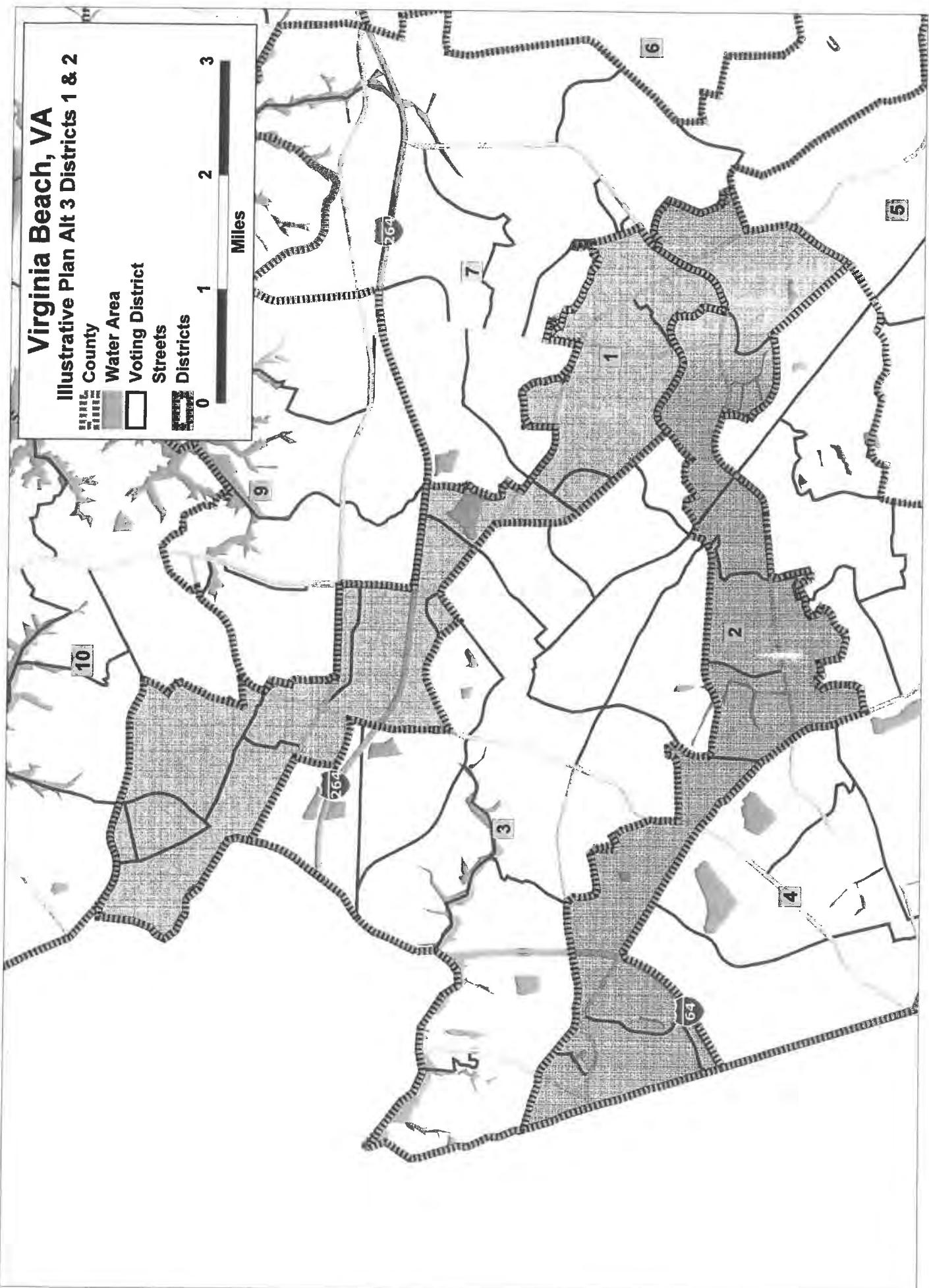
Virginia Beach, VA
Illustrative Alternative 3 Plan - 10 Districts Statistics

District	Population	Deviation	% Deviation	Ispanic Orig	Hispanic Orig	NH_Wht	% NH_Wht	NH_Blk	% NH_Blk	NH_Asn	% NH_Asn	HBATTL	HBATTL%
01	41660	-2139	-4.88%	3776	9.06%	15978	38.35%	17577	42.19%	2410	5.78%	23763	57.04%
02	45279	1480	3.38%	3779	8.35%	19066	42.11%	15238	33.65%	4995	11.03%	24012	53.03%
03	45890	2091	4.77%	2328	5.07%	31805	69.31%	7224	15.74%	2829	6.16%	12381	26.98%
04	41890	-1909	-4.36%	2757	6.58%	22334	53.32%	9193	21.95%	5736	13.69%	17686	42.22%
05	45184	1385	3.16%	2164	4.79%	34026	75.31%	5105	11.30%	2458	5.44%	9727	21.53%
06	45041	1242	2.84%	3412	7.58%	31739	70.47%	6732	14.95%	1345	2.99%	11489	25.51%
07	42833	-966	-2.21%	3225	7.53%	28181	65.79%	7651	17.86%	1886	4.40%	12762	29.79%
08	43345	-454	-1.04%	2491	5.75%	34424	79.42%	4186	9.66%	916	2.11%	7593	17.52%
09	41938	-1861	-4.25%	2325	5.54%	32391	77.24%	4415	10.53%	1496	3.57%	8236	19.64%
10	44934	1135	2.59%	2730	6.08%	32526	72.39%	5889	13.11%	2241	4.99%	10860	24.17%

District	18+_Pop	Deviation	% Deviation	H18+_Pop	% H18+_Pop	NH18+_Wht	% NH18+_Wht	NH18+_Blk	% NH18+_Blk	NH18+_Asn	% NH18+_Asn	HBAVAP	HBAVAP%
01	31085	-2139	-4.88%	2449	7.88%	13288	42.75%	12393	39.87%	1960	6.31%	16802	54.05%
02	33038	1480	3.38%	2401	7.27%	15026	45.48%	10612	32.12%	3943	11.93%	16956	51.32%
03	35159	2091	4.77%	1489	4.24%	25337	72.06%	5194	14.77%	2288	6.51%	8971	25.52%
04	30924	-1909	-4.36%	1737	5.62%	17040	55.10%	6714	21.71%	4592	14.85%	13043	42.18%
05	33185	1385	3.16%	1326	4.00%	25342	76.37%	4044	12.19%	1818	5.48%	7188	21.66%
06	34197	1242	2.84%	2202	6.44%	25080	73.34%	4879	14.27%	1108	3.24%	8189	23.95%
07	32349	-966	-2.21%	2054	6.35%	22245	68.77%	5524	17.08%	1540	4.76%	9118	28.19%
08	34211	-454	-1.04%	1672	4.89%	27965	81.74%	3097	9.05%	741	2.17%	5510	16.11%
09	32822	-1861	-4.25%	1590	4.84%	26023	79.29%	3312	10.09%	1188	3.62%	6090	18.55%
10	35775	1135	2.59%	1845	5.16%	26842	75.03%	4443	12.42%	1800	5.03%	8088	22.61%

District	Total17	Deviation	% Deviation	Hisp17	% Hisp17	White17	% White17	Black17	% Black17	Asian17	% Asian17	HBA17	HBA17%
01	42672	-2139	-4.88%	4609	10.80%	16183	37.92%	16180	37.92%	3310	7.76%	24099	56.47%
02	45428	1480	3.38%	4267	9.39%	17986	39.59%	14730	32.42%	5820	12.81%	24817	54.63%
03	46721	2091	4.77%	3026	6.48%	31200	66.78%	7146	15.30%	3471	7.43%	13643	29.20%
04	43496	-1909	-4.36%	4098	9.42%	22043	50.68%	9681	22.26%	5138	11.81%	18917	43.49%
05	46650	1385	3.16%	2317	4.97%	34186	73.28%	5712	12.24%	2623	5.62%	10652	22.83%
06	46854	1242	2.84%	4129	8.81%	32390	69.13%	6840	14.60%	1434	3.06%	12403	26.47%
07	45082	-966	-2.21%	4098	9.09%	29596	65.65%	7083	15.71%	2107	4.67%	13288	29.48%
08	43206	-454	-1.04%	2344	5.43%	32854	76.04%	4735	10.96%	1263	2.92%	8342	19.31%
09	43243	-1861	-4.25%	2439	5.64%	31879	73.72%	4842	11.20%	1755	4.06%	9036	20.90%
10	46705	1135	2.59%	3928	8.41%	32753	70.13%	6038	12.93%	2134	4.57%	12100	25.91%

District	CVAP17	Deviation	% Deviation	HCVAP17	% HCVAP17	WCVAP17	% WCVAP17	BCVAP17	% BCVAP17	ACVAP17	% ACVAP17	HBACVAP17	% HBACVAP17	HBAWCVP17	% HBAWCVP17
01	31584	-2139	-4.88%	2676	8.47%	13262	41.99%	12239	38.75%	2314	7.33%	17205	54.47%	17600	55.72%
02	31674	1480	3.38%	2277	7.19%	14200	44.83%	10877	34.34%	3311	10.45%	16444	51.92%	16708	52.75%
03	34699	2091	4.77%	1659	4.78%	24721	71.24%	5265	15.17%	2144	6.18%	9090	26.20%	9262	26.69%
04	31558	-1909	-4.36%	2415	7.65%	17392	55.11%	7180	22.75%	3366	10.67%	12962	41.07%	13154	41.68%
05	34289	1385	3.16%	1535	4.48%	25332	73.88%	4512	13.16%	1909	5.57%	7961	23.22%	8134	23.72%
06	34205	1242	2.84%	2492	7.29%	25142	73.50%	4617	13.50%	943	2.76%	8045	23.52%	8315	24.31%
07	33820	-966	-2.21%	2368	7.00%	23496	69.47%	5199	15.37%	1326	3.92%	8885	26.27%	9342	27.62%
08	33514	-454	-1.04%	1327	3.96%	26719	79.72%	3742	11.17%	834	2.49%	5900	17.60%	6106	18.22%
09	33448	-1861	-4.25%	1436	4.29%	25831	77.23%	3702	11.07%	1231	3.68%	6402	19.14%	6501	19.44%
10	35709	1135	2.59%	2038	5.71%	26510	74.24%	4795	13.43%	1422	3.98%	8257	23.12%	8371	23.44%

Note: Variables with 17 suffix denote 2013-2017 5-Year ACS; HBAWCVP17 includes Hispanic, Black, and Asian CVAP plus Black and White CVAP mixed persons

Source: Maptitude for Redistricting District Statistics window using U.S. Census Bureau 2010 Census Data and 2013-2017 5-Year ACS Data

41

User:
Plan Name: **VAB Illustrative Plan Final 10 Alt v3**
Plan Type:

Contiguity Report

Monday, August 19, 2019   11:30 AM

District	Number of Distinct Areas
1	1
2	1
3	1
4	1
5	1
6	1
7	1
8	1
9	1
10	1

User:

Plan Name: **VAB Illustrative Plan Final 10 Alt v3**

Plan Type:

Measures of Compactness Report

Monday, August 19, 2019

11:31 AM

	Reock	Perimeter	Polsby-Popper	MinConvexPoly
Sum	N/A	0.00	N/A	N/A
Min	0.12	N/A	0.12	0.41
Max	0.59	N/A	0.52	0.90
Mean	0.35	N/A	0.33	0.71
Std. Dev.	0.16	N/A	0.15	0.18

District	Reock	Perimeter	Polsby-Popper	MinConvexPoly
1	0.14		0.14	0.49
2	0.12		0.12	0.41
3	0.33		0.35	0.75
4	0.29		0.34	0.71
5	0.51		0.52	0.88
6	0.59		0.45	0.90
7	0.29		0.21	0.58
8	0.56		0.49	0.86
9	0.30		0.24	0.60
10	0.38		0.48	0.88

Maptitude
For Redistricting

43

User:

Plan Name: **VAB Illustrative Plan Final 10 Alt v3**

Plan Type:

Political Subdivison Splits Between Districts

Monday, August 19, 2019	11:32 AM

Total number of subdivisions:

County	0
Voting District	73

Number of subdivisions split into more than one district:

County	1
Voting District	21

Number of splits involving no population:

County	0
Voting District	0

Split Counts

County

  Cases where an area is split among 10 Districts: 1

Voting District

  Cases where an area is split among 2 Districts: 21

County	Voting District	District	Population
Split Counties:			
Virginia Beach City VA		1	41,660
Virginia Beach City VA		2	45,279
Virginia Beach City VA		3	45,890
Virginia Beach City VA		4	41,890
Virginia Beach City VA		5	45,184
Virginia Beach City VA		6	45,041
Virginia Beach City VA		7	42,833
Virginia Beach City VA		8	43,345
Virginia Beach City VA		9	41,938
Virginia Beach City VA		10	44,934
Split VTDs:			
Virginia Beach City VA	Aragona	1	2,298
Virginia Beach City VA	Aragona	9	4,982
Virginia Beach City VA	Avalon	2	583
Virginia Beach City VA	Avalon	3	4,004
Virginia Beach City VA	Bonney	1	2,756
Virginia Beach City VA	Bonney	3	686
Virginia Beach City VA	Buckner	2	3,272
Virginia Beach City VA	Buckner	4	1,473
Virginia Beach City VA	Green Run	1	1,810
Virginia Beach City VA	Green Run	2	5,972
Virginia Beach City VA	Holland	1	5,734
Virginia Beach City VA	Holland	7	2,086
Virginia Beach City VA	Homestead	2	2,939

Political Subdivison Splits Between Districts

VAB Illustrative Plan Final 10

County	Voting District	District	Population
Virginia Beach City VA	Homestead	3	2,788
Virginia Beach City VA	Larkspur	1	1,503
Virginia Beach City VA	Larkspur	3	1,729
Virginia Beach City VA	Lexington	1	913
Virginia Beach City VA	Lexington	3	4,344
Virginia Beach City VA	Magic Hollow	2	3,396
Virginia Beach City VA	Magic Hollow	7	3,913
Virginia Beach City VA	Mt.Trashmore	1	121
Virginia Beach City VA	Mt.Trashmore	7	5,945
Virginia Beach City VA	Pleasant Hill	1	36
Virginia Beach City VA	Pleasant Hill	3	4,338
Virginia Beach City VA	Rosemont Forest	2	1,944
Virginia Beach City VA	Rosemont Forest	4	3,779
Virginia Beach City VA	Round Hill	2	3,859
Virginia Beach City VA	Round Hill	4	3,349
Virginia Beach City VA	Shannon	1	451
Virginia Beach City VA	Shannon	3	2,877
Virginia Beach City VA	Shell	1	1,103
Virginia Beach City VA	Shell	10	3,413
Virginia Beach City VA	Sherry Park	2	585
Virginia Beach City VA	Sherry Park	3	1,914
Virginia Beach City VA	Stratford Chase	2	1,711
Virginia Beach City VA	Stratford Chase	3	2,268
Virginia Beach City VA	Timberlake	2	4,585
Virginia Beach City VA	Timberlake	3	1,949
Virginia Beach City VA	Upton	5	3,627
Virginia Beach City VA	Upton	6	1,469
Virginia Beach City VA	Windsor Oaks	1	1,197
Virginia Beach City VA	Windsor Oaks	7	5,310

Virginia Beach, VA
Illustr Plan Alt 3 Dist 1&2 Subdiv Zoom

Subdivision
Voting District
Districts

0   .5   1   1.5
Miles

Virginia Beach, VA
Illustrative Plan Alt 4 District 1

County
Water Area
Streets
Voting District
Districts

Miles
0   .5   1   1.5

47
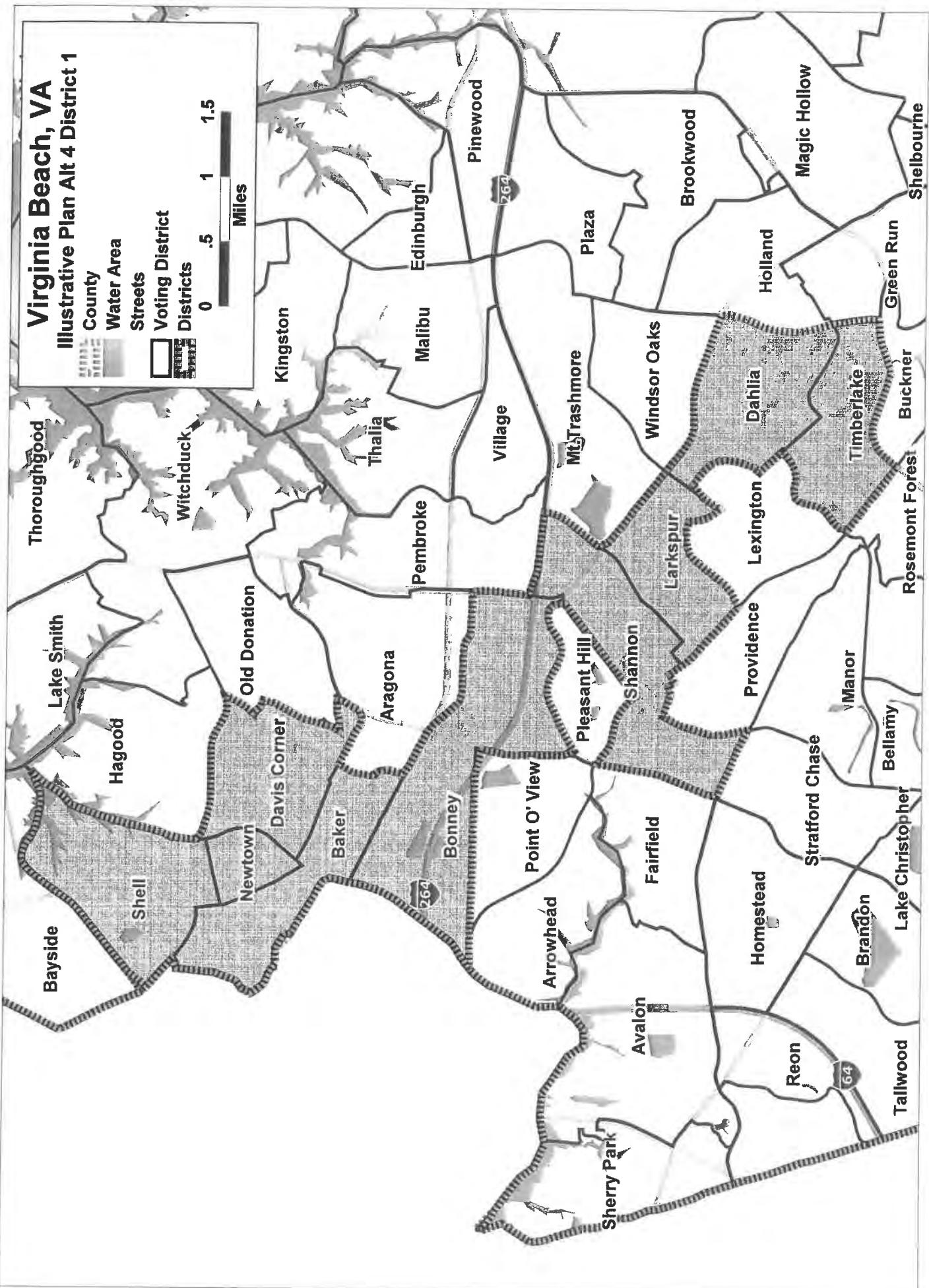
Virginia Beach, VA
Illustrative Alternative 4 Plan - District 1 Statistics

District	Population	Deviation	% Deviation	Hispanic Orig	Hispanic Orig	NH_Wht	% NH_Wht	NH_Blk	% NH_Blk	NH_Asn	% NH_Asn	HBATTL	HBATTL%
01	44790	991	2.26%	3465	7.74%	19740	44.07%	16850	37.62%	2796	6.24%	23111	51.60%

District	18+_Pop	Deviation	% Deviation	H18+_Pop	% H18+_Pop	NH18+_Wht	% NH18+_Wht	NH18+_Blk	% NH18+_Blk	NH18+_Asn	% NH18+_Asn	HBAVAP	HBAVAP%
01	33494	991	2.26%	2236	6.68%	16315	48.71%	11723	35.00%	2240	6.69%	16199	48.36%

District	Total17	Deviation	% Deviation	Hisp17	% Hisp17	White17	% White17	Black17	% Black17	Asian17	% Asian17	HBA17	HBA17%
01	46033	991	2.26%	5191	11.28%	19183	41.67%	15251	33.13%	4152	9.02%	24594	53.43%

District	CVAP17	Deviation	% Deviation	HCVAP17	% HCVAP17	WCVAP17	% WCVAP17	BCVAP17	% BCVAP17	ACVAP17	% ACVAP17	HBACVAP17	% HBACVAP17	HBAWCVP17	% HBAWCVP17
01	33523	991	2.26%	2759	8.23%	15538	46.35%	11328	33.79%	2859	8.53%	16956	50.58%	17252	51.46%

Note: Variables with 17 suffix denote 2013-2017 5-Year ACS; HBAWCVP17 includes Hispanic, Black, and Asian CVAP plus Black and White CVAP mixed persons

Source: Maptitude for Redistricting District Statistics window using U.S. Census Bureau 2010 Census Data and 2013-2017 5-Year ACS Data

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User:
Plan Name: **VAB Illustrative Plan Final 10 Alt v4**
Plan Type:

Contiguity Report

Monday, August 19, 2019   12:48 PM

District	Number of Distinct Areas
1	1

49

User:

Plan Name: **VAB Illustrative Plan Final 10 Alt v4**

Plan Type:

Measures of Compactness Report

Monday, August 19, 2019   12:51 PM

	Reock	Perimeter	Polsby-Popper	MinConvexPoly
Sum	N/A	0.00	N/A	N/A
Min	0.19	N/A	0.11	0.47
Max	0.19	N/A	0.11	0.47
Mean	0.19	N/A	0.11	0.47
Std. Dev.	N/A	N/A		

District	Reock	Perimeter	Polsby-Popper	MinConvexPoly
1	0.19		0.11	0.47

Maptitude
For Redistricting

50

User:

Plan Name: **VAB Illustrative Plan Final 10 Alt v4**

Plan Type:

Political Subdivison Splits Between Districts

Monday, August 19, 2019   12:52 PM

Total number of subdivisions:

County	0
Voting District	94

Number of subdivisions split into more than one district:

County	1
Voting District	0

Number of splits involving no population:

County	0
Voting District	0

Split Counts

County

  Cases where an area is split among 2 Districts: 1

County	Voting District	District	Population
Split Counties:			
Virginia Beach City VA		1	44,790

Virginia Beach, VA
Illustr Plan Alt 4 Dist 1 Subdiv Zoom

Subdivision
Voting District
Districts

0   .5   1   1.5
Miles

Virginia Beach, VA
Illustrative Plan Alt 5 District 1

County
Water Area
Voting District
Streets
Districts

0   .5   1   1.5
Miles
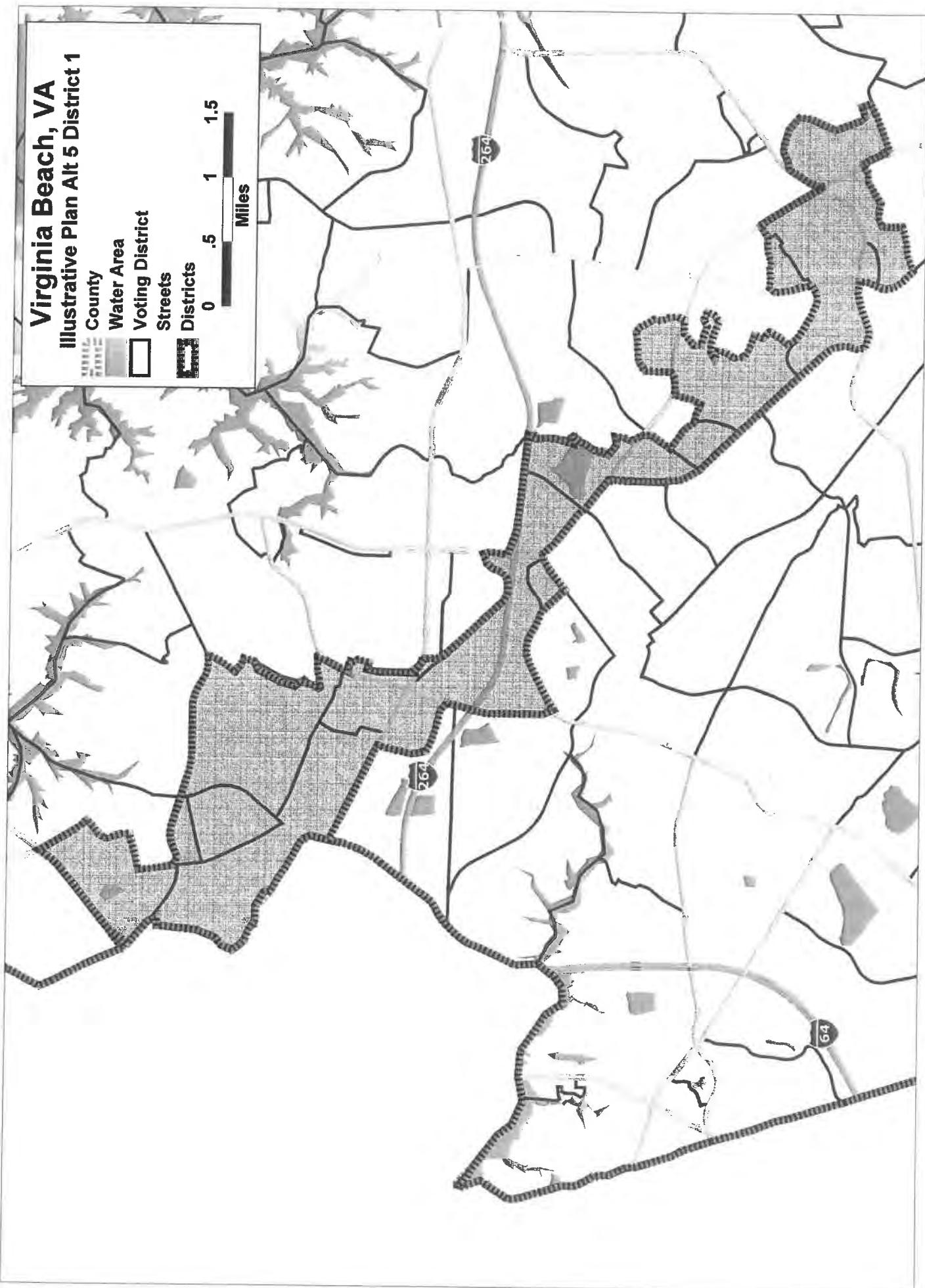
Virginia Beach, VA
Illustrative Alternative 5 Plan - District 1 Statistics

District	Population	Deviation	% Deviation	Hispanic Origin	% Hispanic Origin	NH_Wht	% NH_Wht	NH_Blk	% NH_Blk	NH_Asn	% NH_Asn	HBTTL	HBTTL%	HBATTL	HBATTL%
01	41832	-1967	-4.49%	3774	9.02%	14973	35.79%	18565	44.38%	2633	6.29%	22339	53.40%	24972	59.70%

District	18+ Pop	Deviation	% Deviation	H18+ Pop	% H18+ Pop	NH18+_Wht	% NH18+_Wht	NH18+_Blk	% NH18+_Blk	NH18+_Asn	% NH18+_Asn	HBVAP	HBVAP%	HBAVAP	HBAVAP%
01	30747	-1967	-4.49%	2455	7.98%	12395	40.31%	12851	41.80%	2077	6.76%	15306	49.78%	17383	56.54%

District	Total17	Deviation	% Deviation	Hisp17	% Hisp17	White17	% White17	Black17	% Black17	Asian17	% Asian17	HB17	HB17%	HBA17	HBA17%
01	43187	-1967	-4.49%	5033	11.65%	14312	33.14%	17953	41.57%	3510	8.13%	22986	53.22%	26496	61.35%

District	CVAP17	Deviation	% Deviation	HCVAP17	% HCVAP17	WCVAP17	% WCVAP17	BCVAP17	% BCVAP17	ACVAP17	% ACVAP17	HBCVAP17	% HBCVAP17	HBBWCVP17	% HBBWCVP17
01	30597	-1967	-4.49%	2657	8.68%	11984	39.17%	12960	42.36%	2090	6.83%	15617	51.04%	15962	52.17%

District	CVAP17	Deviation	% Deviation	HBACVP17	% HBACVP17	HBAWCVP17	% HBAWCVP17
01	30597	-1967	-4.49%	17669	57.75%	18018	58.89%

Note: Variables with 17 suffix denote 2013-2017 5-Year ACS; HBAWCVP17 includes Hispanic, Black, and Asian CVAP plus Black and White CVAP combined race persons; HBCVAP Includes Hispanic and Black Alone and is calculated by summing Hispanic and Black fields. HBBWCVP17 includes Hispanic and Black CVAP plus Black CVAP plus Black and White CVAP combined persons

Source: Maptitude for Redistricting District Statistics window using U.S. Census Bureau 2010 Census Data and 2013-2017 5-Year ACS Data

54

User:
Plan Name: **VAB Illustrative Plan Final 10 Alt v5**
Plan Type:

Contiguity Report

Monday, August 19, 2019   2:35 PM

District	Number of Distinct Areas
1	1

55

User:
Plan Name: **VAB Illustrative Plan Final 10 Alt v5**
Plan Type:

Measures of Compactness Report

Monday, August 19, 2019   3:16 PM

	Reock	Perimeter	Polsby-Popper	MinConvexPoly
Sum	N/A	0.00	N/A	N/A
Min	0.11	N/A	0.09	0.42
Max	0.11	N/A	0.09	0.42
Mean	0.11	N/A	0.09	0.42
Std. Dev.	N/A	N/A		

District	Reock	Perimeter	Polsby-Popper	MinConvexPoly
1	0.11		0.09	0.42

Maptitude
for Redistricting

56

User:

Plan Name: **VAB Illustrative Plan Final 10 Alt v5**

Plan Type:

Political Subdivison Splits Between Districts

Monday, August 19, 2019   3:19 PM

Total number of subdivisions:

County	0
Voting District	78

Number of subdivisions split into more than one district:

County	1
Voting District	16

Number of splits involving no population:

County	0
Voting District	0

Split Counts

County

 Cases where an area is split among 2 Districts: 1

Voting District

 Cases where an area is split among 2 Districts: 16

County	Voting District	District	Population
Split Counties:			
Virginia Beach City VA		1	41,832
Split VTDs:			
Virginia Beach City VA	Aragona	1	2,028
Virginia Beach City VA	Bonney	1	1,581
Virginia Beach City VA	Buckner	1	228
Virginia Beach City VA	Dahlia	1	3,124
Virginia Beach City VA	Davis Corner	1	5,991
Virginia Beach City VA	Green Run	1	5,372
Virginia Beach City VA	Holland	1	906
Virginia Beach City VA	Larkspur	1	1,503
Virginia Beach City VA	Lexington	1	913
Virginia Beach City VA	Magic Hollow	1	3,396
Virginia Beach City VA	Mt.Trashmore	1	121
Virginia Beach City VA	Pleasant Hill	1	36
Virginia Beach City VA	Shannon	1	451
Virginia Beach City VA	Shell	1	3,018
Virginia Beach City VA	Timberlake	1	2,067
Virginia Beach City VA	Windsor Oaks	1	1,197

Maptitude
For Redistricting

Page 1 of 1

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Virginia Beach, VA
Illustr Plan Alt 5 Dist 1 Subdiv Zoom

Subdivision
Voting District
Districts

0   .5   1   1.5
Miles

58

Appendix B

Disaggregation Analysis

Alternative Plans 1 through 5

Illustrative Plan Disaggregation Analysis

Dist	CVAP17 DisAg	CVAP17 Strp	CVAP DisAg	CVAP17 Chg	CVAP17
01	29766.09305	29641	29761	-5.09305	29761
02	32803.88821	32642	32804	0.11179	32804
03	31961.85648	31819	31960	-1.85648	31960
04	33799.93322	33623	33802	2.06678	33802
05	34688.84486	34407	34689	0.15514	34689
06	34443.57816	34140	34447	3.42184	34447
07	35686.66521	35367	35686	-0.66521	35686
08	33657.33407	33485	33660	2.66593	33660
09	32840.24399	32637	32843	2.75601	32843
10	34851.55528	34651	34848	-3.55528	34848

Dist	HBAC17 DisAg	HBAC17 Strp	HBA DisAg	HBAC17 Chg	HBA CVAP17	HBA CVAP17% Mapt	HBA CVAP17% Mapt wo/LPB
01	14892.63910	14770	14888	-4.63910	14888	50.03%	50.03%
02	16414.14826	16235	16415	0.85174	16415	50.04%	50.04%
03	13364.47424	13218	13365	0.52576	13365	41.82%	41.81%
04	10612.27770	10435	10612	-0.27770	10612	31.39%	31.40%
05	7131.76589	6861	7133	1.23411	7133	20.56%	20.56%
06	7428.54973	7128	7430	1.45027	7430	21.57%	21.57%
07	5228.71792	4928	5228	-0.71792	5228	14.65%	14.65%
08	9655.04044	9476	9658	2.95956	9658	28.69%	28.69%
09	8862.08495	8665	8863	0.91505	8863	26.99%	26.99%
10	7561.30030	7364	7559	-2.30030	7559	21.69%	21.70%

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Illustrative Plan Alternative 1 Disaggregation Analysis

Dist	CVAP17 DisAg	CVAP17 Strp	CVAP DisAg	CVAP17 Chg	CVAP17
01	28294.91925	28180	28295	5.08075	28300
02	32619.56148	32457	32620	14.43852	32634
03	31767.84965	31622	31768	2.15035	31770
04	34596.28074	34413	34596	-12.28074	34584
05	34593.46698	34307	34593	-13.46698	34580
06	33748.02261	33455	33748	7.97739	33756
07	35686.66521	35367	35687	-0.66521	35686
08	34767.36566	34591	34767	7.63434	34775
09	33669.07549	33462	33669	6.92451	33676
10	34756.78546	34558	34757	-17.78546	34739

Dist	HBAC17 DisAg	HBAC17 Strp	HBA DisAg	HBAC17 Chg	HBA CVAP17	HBA CVAP17% Mapt	HBA CVAP17% Mapt wo/LPB
01	14568.96817	14454	14575	6.03183	14575	51.50%	51.49%
02	16834.47508	16656	16851	16.52492	16851	51.64%	51.61%
03	13176.52580	13027	13179	2.47420	13179	41.48%	41.48%
04	10709.12832	10526	10696	-13.12832	10696	30.93%	30.95%
05	6521.19601	6246	6511	-10.19601	6511	18.83%	18.85%
06	7456.68305	7166	7460	3.31695	7460	22.10%	22.10%
07	5228.71792	4928	5228	-0.71792	5228	14.65%	14.65%
08	9756.58947	9574	9765	8.41053	9765	28.08%	28.06%
09	8992.32990	8791	8998	5.67010	8998	26.72%	26.71%
10	7906.38480	7712	7888	-18.38480	7888	22.71%	22.75%

Source: U.S. Census Bureau 2013-2017 5-Year ACS; Maptitude for Redistricting Disaggregated CVAP data and Disaggregation data wo/Largest Populated Block technique

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Illustrative Plan Alternative 2 Disaggregation Analysis

Dist	CVAP17 DisAg	CVAP17 Strp	CVAP DisAg	CVAP17 Chg	CVAP17
01	28224.99984	28106	28225	0.00016	28225
02	32395.00059	32237	32395	-0.00059	32395
03	32612.66803	32467	32613	3.33197	32616
04	33852.65126	33678	33853	-3.65126	33849
05	36147.09303	35845	36147	-10.09303	36137
06	33162.58693	32872	33163	10.41307	33173
07	35686.66521	35367	35687	-0.66521	35686
08	34767.36566	34591	34767	7.63434	34775
09	33669.07549	33462	33669	6.92451	33676
10	33981.88649	33787	33982	-13.88649	33968

Dist	HBAC17 DisAg	HBAC17 Strp	HBA DisAg	HBAC17 Chg	HBA CVAP17	HBA CVAP17% Mapt	HBA CVAP17% Mapt wo/LPB
01	14404.99995	14286	14405	0.00005	14405	.51.04%	51.04%
02	16545.00019	16370	16545	-0.00019	16545	51.07%	51.07%
03	13591.51763	13441	13595	3.48237	13595	41.68%	41.68%
04	10614.56649	10439	10611	-3.56649	10611	31.35%	31.36%
05	7023.63545	6733	7016	-7.63545	7016	19.42%	19.43%
06	7338.28033	7052	7346	7.71967	7346	22.14%	22.13%
07	5228.71792	4928	5228	-0.71792	5228	14.65%	14.65%
08	9756.58947	9574	9765	8.41053	9765	28.08%	28.06%
09	8992.32990	8791	8998	5.67010	8998	26.72%	26.71%
10	7655.36119	7466	7642	-13.36119	7642	22.50%	22.53%

Source: U.S. Census Bureau 2013-2017 5-Year ACS; Maptitude for Redistricting Disaggregated CVAP data and Disaggregation data wo/Largest Populated Block technique

Illustrative Plan Alternative 3 Disaggregation Analysis

Dist	CVAP17 DisAg	CVAP17 Strp	CVAP DisAg	CVAP17 Chg	CVAP17
01	31587.28131	31469	31587	-3.28131	31584
02	31665.70626	31527	31666	8.29374	31674
03	34705.61224	34489	34706	-6.61224	34699
04	31558.23867	31421	31558	-0.23867	31558
05	34292.10237	34094	34292	-3.10237	34289
06	34203.94757	33973	34204	1.05243	34205
07	33811.75044	33634	33812	8.24956	33820
08	33502.68562	33198	33503	11.31438	33514
09	33462.97047	33198	33463	-14.97047	33448
10	35709.69757	35409	35710	-0.69757	35709

Dist	HBAC17 DisAg	HBAC17 Strp	HBA DisAg	HBAC17 Chg	HBA CVAP17	HBA CVAP17% Mapt	HBA CVAP17% Mapt wo/LPB
01	17197.04206	17067	17205	7.95794	17205	54.47%	54.44%
02	16435.31021	16294	16444	8.68979	16444	51.92%	51.90%
03	9093.91607	8882	9090	-3.91607	9090	26.20%	26.20%
04	12963.08539	12823	12962	-1.08539	12962	41.07%	41.08%
05	7964.64672	7768	7961	-3.64672	7961	23.22%	23.23%
06	8045.21025	7835	8045	-0.21025	8045	23.52%	23.52%
07	8879.99670	8686	8885	5.00330	8885	26.27%	26.26%
08	5887.58880	5595	5900	12.41120	5900	17.60%	17.57%
09	6427.16387	6167	6402	-25.16387	6402	19.14%	19.21%
10	8257.03843	7963	8257	-0.03843	8257	23.12%	23.12%

Source: U.S. Census Bureau 2013-2017 5-Year ACS; Maptitude for Redistricting Disaggregated CVAP data and Disaggregation data wo/Largest Populated Block technique

Illustrative Plan Alternative 4 Disaggregation Analysis

Dist	CVAP17 DisAg	CVAP17 Strp	CVAP DisAg	CVAP17 Chg	CVAP17
01	33533.20337	33370	33533	-10.20337	33523

Dist	HBAC17 DisAg	HBAC17 Strp	HBA DisAg	HBAC17 Chg	HBA CVAP17	HBA CVAP17% Mapt	HBA CVAP17% Mapt wo/LPB
01	16960.87827	16799	16956	-4.87827	16956	50.58%	50.58%

Source: U.S. Census Bureau 2013-2017 5-Year ACS; Maptitude for Redistricting Disaggregated CVAP data and Disaggregation data wo/Largest Populated Block technique

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Illustrative Plan Alternative 5 Disaggregation Analysis

Dist	CVAP17 DisAg	CVAP17 Strp	CVAP DisAg	CVAP17 Chg	CVAP17
01	30594.34636	30490	30594	2.65364	30597

Dist	HBC17 DisAg	HBC17 Strp	HB DisAg	HBC17 Chg	HBA CVAP17	HBA CVAP17% Mapt	HBA CVAP17% Mapt wo/LPB
01	17657.89626	17535	17669	11.10374	17669	57.75%	57.72%

Dist	HBC17 DisAg	HBC17 Strp	HB DisAg	HBC17 Chg	HB CVAP17	HB CVAP17% Mapt	HB CVAP17% Mapt wo/LPB
01	15590.04023	15474	15617	26.95977	15617	51.04%	50.96%

Source: U.S. Census Bureau 2013-2017 5-Year ACS; Maptitude for Redistricting Disaggregated CVAP data and Disaggregation data wo/Largest Populated Block technique

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Appendix C

Maptitude for Redistricting Partial Client List

Maptitude for Redistricting is used by a majority of the state legislatures, both political parties, county and regional governments, city and local governments, educational institutions, and many public interest groups and corporations. Partial list:

National Government & Party Organizations

Democratic National Committee
Department of Justice, Civil Rights Division
National Committee for an Effective Congress
National Republican Congressional Committee
Republican National Committee

State Government & Organizations

Alabama Democratic Party
Alabama House Majority
Alaska Division of Elections
Arizona Democratic Party
Arizona House of Representatives
Arizona Independent Electoral Commission
Arizona Redistricting Commission
Arizona Republican Party
Arizona Senate Democrats
California Assembly Rules Committee
California Governor's Office
California Legislative Data Center
California Senate Office of Research
California Senate Minority Reapportionment
California State Assembly
Colorado Department of State
Colorado Governor's Office
Colorado House of Representatives
Colorado Reapportionment Commission
Colorado Republican Party
Delaware Commissioner of Elections
Delaware Legislature
District of Columbia Republican Party
Georgia Democratic Party
Georgia General Assembly
Georgia Office of Planning and Budget
Georgia Redistricting Services
Georgia Republican Party
Idaho Legislative Services
Illinois House Republican Caucus
Illinois Senate Republican Caucus
Kansas Legislative Research Department
Kentucky Legislative Research Commission
Kentucky Republican Party
Louisiana Democratic Party
Louisiana House of Representatives
Louisiana Senate
Maine Democratic Party
Maine Judicial Center
Maine Legislature
Maryland Department of Legislative Services
Maryland General Assembly
Maryland Governor's Census 2000
Maryland Office of Planning
Maryland Republican Party
Massachusetts House of Representatives
Massachusetts Senate
Massachusetts Senate Clerk's Office
Massachusetts Speakers Office
Michigan Democratic Party
Minnesota DFL
Minnesota Governor's Office
Minnesota Land Management Information Center

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Minnesota Legislative Coordinating Commission
Minnesota Office of Planning
Minnesota Republican Party
Minnesota Secretary of State
Minnesota Senate
Minnesota Supreme Court
Mississippi Chambers of Hon. E. Gray Jolly
Mississippi Community Policy Research
Mississippi Joint Reapportionment Committee
Mississippi Republican Party
Missouri Democratic Party
Missouri House of Representatives
Missouri Office of Administration
Missouri Office of Management, Budget, and Planning
Missouri Republican Party
Missouri Senate
Nevada Republican Assembly Caucus
Nevada Republican Party
New Hampshire GCIS
New Jersey Office of Legislative Services
New Mexico Republican Party
New York Empire State Development
New York Leg. Task Force on Demographic Research & Reapportionment
New York State Assembly Democratic Majority
New York State Assembly Republican Caucus
New York State Democratic Senate Campaign Committee
New York State Governor's Office
New York State Office of Technology
New York State Republican Assembly Campaign Committee
New York State Senate Majority
New York State Senate Minority
North Carolina Democratic Party
North Carolina General Assembly
North Carolina Republican Party
North Dakota Legislative Council
Ohio Republican Party
Ohio Secretary of State
Oklahoma Governor's Office
Oklahoma Senate
Pennsylvania House Democrats
Pennsylvania Senate Democrats
Puerto Rico Supreme Court
South Carolina Budget and Control Board
South Carolina House of Representatives
South Carolina House Republican Caucus
South Carolina Senate
South Carolina Senate Republican Caucus
Tennessee Attorney General
Tennessee General Assembly
Tennessee Office of Legal Services
Texas Comptroller of Public Accounts
Texas General Land Office
Texas Legislative Council
Utah Republican Party
Vermont Legislative Council
Virginia Democratic Caucus
West Virginia Democratic Legislative Council
West Virginia Legislature
Wyoming Democratic Party
Wyoming Legislature
Wyoming Republican Party

County Government & Regional Planning Organizations

Acadiana LA Regional Development District
Alabama Association of County Commissioners
Alameda County CA, Community Development

Alamosa County CO, County Clerk
Anne Arundel County MD
Anoka County MN
Assateague Island MD National Seashore
Barton County KS
Becker County MN
Benton County MN
Blount County AL, County Commission
Boone County WV Commission
Brooke County WV, County Commission
Butte County CA
Calvert County MD
Capitol Region LA Planning Commission
Cerro Gordo County IA
Chambers County AL Commission
Chambers County AL, Board of Education
Chaffee County CO
Champaign County IL, County Clerk
Chisago County MN
Clark County NB Manager's Office
Clay County WV, County Commission
Cobb County GA Elections
Comal County TX
Contra Costa CA, Water District
Coweta County GA
Cumberland County ME
Elbert County CO
Forsyth County GA
Glenn County CA, Elections Department
Grand County CO
Hardee County FL
Hardin County KY, County Clerk
Hardy County WV Clerk
Harris County TX, Tax Office
Harris County TX, Republican Party
Hennepin County MN
Hennepin County MN Elections
Hood County TX
Inyo County CA, Planning Department
Jackson County MN
Kanawha County WV, Clerk/Elections
Kent County DE
Kent County MI
Kent County MN
Jackson County MO, Election Board
Jefferson County CO, County Clerk and Recorder
Jefferson County WV Clerk
Johnson County KS, Election Office
Kisatchie-Delta LA Regional Planning and Development
Lewis County WV Clerk
Liberty County GA Board of Commissioners
Lincoln County MT
Logan County CO Clerk and Recorder
Los Angeles CA Superior Court
Louisiana Acadiana Regional Development District
Louisiana Central Regional Planning District
Louisiana Kisatchie-Delta Planning and Development
Louisiana North Delta Regional Development
Louisiana Rapides Area Planning Commission
Louisiana South Central Planning and Development
Lyon County MN
Madison County AL Board of Education
Madison County AL Commission
Marion County WV
Marshall County WV, County Clerk

McCracken County KY
Miami-Dade County FL, Board of County Commissions
Mobile County AL, Engineer's Office
Monongalia County WV, Clerk's Office
Nassau County NY
Navajo Nation AZ
Nevada County CA
New Castle County DE
North Delta LA RPDD
Nowata County OK, Clerk
Pasco County FL, Supervisor of Elections
Pierce County WA, Elections
Pipestone County WV
Pocahontas County WV Commission
Polk County FL, Supervisor of Elections
Putnam County FL, Supervisor of Elections
Putnam County WV, County Clerk
Ramsey County MN
Roane County WV 911
Rapides Area Planning Commission
Saint Louis County MN
Saint Lucie County FL, Community Development
Saint Lucie County FL, Supervisor of Elections
San Benito County CA
San Diego Community College District
San Diego County Data Processing
Sanford/Lee County NC, County Commission
Santa Barbara County CA
Santa Cruz County CA, ISD Department
South Central LA Planning
Stillwater County MT GIS
Summit County NJ Board of Elections
Summit County OH, Republican Party
Sumter County FL, Supervisor of Elections
Tate County MS
Three Rivers MN Park District
Tippecanoe County IN, Republican Party
Trinity County CA
Trinity County TX
Valley Transportation Authority (CA)
Vigo County IN
Walton County FL Board of Commissioners
Westchester County NY
Westchester County NY Republicans
Wicomico County MD
Wood County WV

City Governments

Albany NY, Common Council
Baltimore MD, City Council
Baltimore MD, Mayor's Office
Bloomington MN
Buffalo NY, City Clerk
Cambridge MD Commissioners
Champlain MN
Columbia MO
Dallas, TX
Denver CO, Election Commission
Douglasville GA
Haverford PA
Jefferson MO
Lake Charles LA
Los Angeles CA Council
Maple Grove MN
Minneapolis MN Metropolitan Council

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New York NY City Council
New York NY Redistricting Commission
Pasadena CA
Pensacola FL, Planning and Neighborhood Development
Phoenix AZ
Pocomoke MD
Pueblo y Salud CA
Richfield MN
Robbinsdale MN
Saint Louis Park MN
San Francisco CA, Department of Elections
San Leandro CA
Shorewood MN
Temple TX
Villages FL
Westport CT

Educational Institutions

Alabama State University Center for Leadership and Public Policy
Benedict College
Claremont McKenna College Rose Institute
Cronkite School of Journalism
CUNY Graduate Center
CUNY, Medgar Evers College
George Mason University
Georgia Institute of Technology
Georgia State University
Jefferson State Community College
MARIS MS
Mississippi State University/Stennis Institute
Norfolk State University
Queens College
Paul Quinn College Urban Institute
Princeton University Woodrow Wilson School
Rice University
San Diego Community College
Southern Illinois University
University of Alabama, Dept. of Geography
University of California, Berkeley, Statewide Database
University of California, Los Angeles, Department of Urban Planning
University of Florida
University of Georgia Redistricting Services
University of New Orleans
University of Pennsylvania Law School
University of Texas, Pan American

Interest Groups and Corporations

Aboussie & Associates
Advance Policy Institute
American Civil Liberties Union
American Public Dialogue
Analytica Research Corp.
Applied Research Coordinates
Arizona State AFL-CIO
Asian American Legal Defense Fund
Asian Law Alliance
Asian Pacific American Legal Center
Assateague Island National Seashore
Barney L. Knight and Associates
Baselice & Associates
Beacon Blue, LLC
Benedict College
BonData
Boyer & Associates
Brock, Clay, Calhoun, Wilson, and Rogers
Capitol Campaign Strategies

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CAUSE
CBC Policy and Leadership Institute
Cedric Floyd
Centre d'Entreprises d'Idelux (Luxembourg)
Citizens for Fair Redistricting
Colorado Hispanic Bar Association
Community Cartography
Conservative Opportunities
Coordinating and Development Corporation
Databasics
Datatrends
DCI Group
DelBello Donellan Weingarth Tartallia
Dellums, Barauer, Halterman, and Assoc.
Delta Consulting Association
Democratic Project
DFS Associates
Electoral Geodemographics
EPIC/MRA
ERF and Associates
Fields Communications
Food Research & Action Center
Friends of Dennis Cardoza
Frontier International Electoral Consulting
Gathings, Kennedy and Associates
Geopolitical Solutions
Gilliard Blanning & Associates
Gilmore and Monahan
Girl Scouts of San Jacinto Council
Guinn and Morrison
Harris, Shelton
Heffley & Associates
Hispanic Leadership Institute
Holland and Rigby
Hong Kong Geomatics Consultants
Infinity Group
Integrated Demographic Profiles
James Blacksher
Jewish Community Relations Council
Joe Shumate and Associates
John Stennis Institute at Mississippi State University
Jones, Cork, and Miller LLP
KVUE-TV
Lapkoff & Gobalet Demographic Research
Law Offices of Darryl Piggee
Law Offices of James C. Belt
Law Offices of Rolando Rios
Law Offices of Samuel L. Walters
Lawyers' Committee for Civil Rights Under Law
Legislative Demographic Services
Levine McEvoy
Louisiana Coordinating and Development Corporation
Matrix
MALDEF
Map Applications
McNally Temple Associates
Metro Consulting
Metropolitan Area Research
Metro-Rent, Inc.
Mexican-American Legal Defense Fund (MALDEF)
NAACP Legal Defense Fund
National Demographics
Navajo Nation
Nielson Media Research
Nielson, Merksamer

Oxford Systematics
Pactech Data and Research
Panacea Consulting
PBS&J
PDQ GeoDemographics
Phillips McFall
Polidata
Precision Cartographics
Reapportinment Group 2000
Redistricting LLC
Research Advisory Services
Romero Molina
Sacks Tierney
Shephard and Staats
Smith and Mahoney, PC
Smith, Ellis, & Stuckey
South Carolina Fair Share
Southern Policy Law Center
Southern Regional Council
Teaching That Works
Texans Against Gerrymandering
Texans for Fair Redistricting
Texas Trial Lawyers Association
Tharrington Smith, LLP
USHLI
Voter Solutions
W. Hayword Burns Environmental E.C.
Whitman Soule
William C. Velasquez Institute
Xerox Corporation

Maptitude Online Redistricting Clients

Arizona Redistricting Commission
City of Los Angeles
Fairfax VA
Idaho Legislature
New York City Districting Commission
Orange County CA

Anthony E. Fairfax

Anthony E. Fairfax is a Demographic Consultant and President of CensusChannel LLC. For over 20 years, Mr. Fairfax worked as a demographic data & mapping consultant. Specializing in redistricting, he has personally developed hundreds of redistricting plans covering 22 different states.

During the span of his consulting tenure, Mr. Fairfax provided redistricting services and training to numerous non-profit and public sector groups. A partial list of these organizations include:

- Advancement Project;
- African American Redistricting Collaborative of California;
- Congressional Black Caucus Institute;
- Louisiana Legislative Black Caucus;
- National NAACP;
- NAACP Legal Defense Fund (LDF);
- One Voice;
- Southern Coalition for Social Justice;
- Young Elected Officials (YEO) Network.

Mr. Fairfax worked as an expert providing redistricting plans, research and analysis for several court cases. Recently, he was an expert witness for one of the plaintiffs in the recent Texas court case (Perez vs State of Texas). In addition, he was selected as the Project Director and Consulting Demographer for the Congressional Black Caucus Institute's (CBC Institute) Redistricting Project. Ten years prior, during the 2000 redistricting cycle, he was the CBC Institute's Consulting Demographer as well.

Mr. Fairfax has published two unique books: A Step-by-Step Guide to Using Census 2000 Data (2004); and The Democratic Trend Phenomenon (2008). He is an Electrical Engineering graduate of Virginia Tech and resides in Hampton, Virginia.

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EXHIBIT
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